

NOVEMBER 26, 1942

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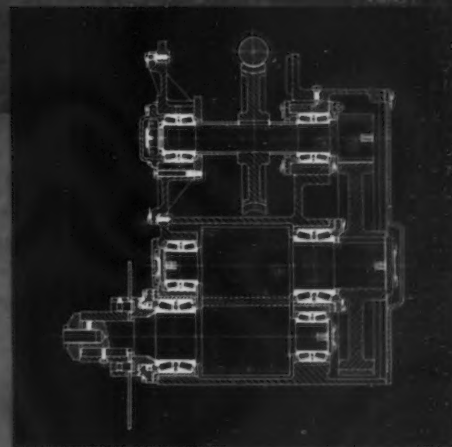
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COMPANY, CANTON, OHIO

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TAPERED ROLLER BEARINGS



Bonnot 36"-48" Hydrofeed Cold Saw shown in operation in the Timken Steel Plant.

Application of Timken Bearings in the Bonnot Hydrofeed Cold Saw.



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by using methods and materials immediately available. Construction is under the constant control of competent engineers who make sure that every crane measures up to its job. Whiting Corporation, 15601 Lathrop Ave., Harvey, Illinois.

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NOVEMBER 26, 1942

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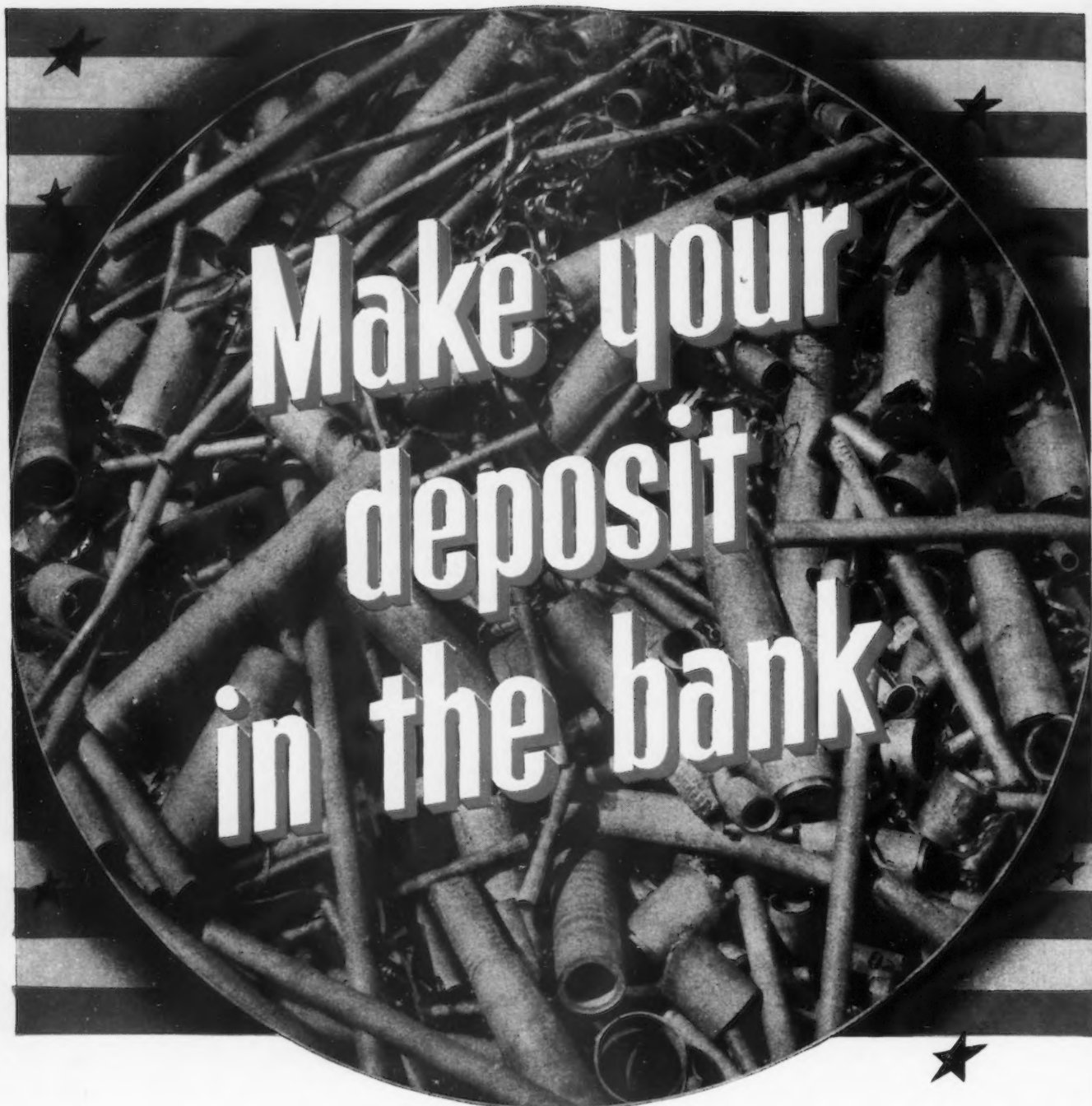
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SCRAP piles are much more than mere collections of trim ends, cuttings, useless machines, parts and junk these days. They're vital national resources—*American Treasures*, in fact, in this critical year; because the nation's steel producers will need several million more tons of scrap in 1942 than ever before, if the demands of war production are to be met. • How much can *you* contribute? Not just the usual scrap flow from your operations, but *all* the idle metal around your buildings and yards that it isn't absolutely essential to keep. Your deposit in the scrap bank will pay dividends all over the world—*make it a real one!*



Allegheny Ludlum
STEEL CORPORATION
 GENERAL OFFICES: PITTSBURGH, PENNSYLVANIA

THE IRON AGE

• •
NOVEMBER 26, 1942

• •
ESTABLISHED 1855



Home Work without Textbooks

MUCH has been printed on the subject of selling under these difficult war time conditions. New ideas on the strategy and tactics of selling have been expounded. Pessimists have told us to scuttle the sales ship, while optimists have stressed the necessity of selling what you've got, when you haven't got it.

But I wonder whether the good-will angle of helping your customers with their home work, even though you can no longer sell them the textbooks, has been brought home to you who are sales executives.

Put yourself in the position of a management charged with the responsibility of fulfilling war orders. The management of a company to which in the past you and a competitor have sold equipment, material or supplies. Because you apparently have nothing that you can sell, you decide to suspend sales effort and fire your salesmen or perhaps put them to work in the plant. You say: "What's the use of bothering our customers; they have too much to do anyway."

Well, that is probably quite true. And the busy former customer seems not to miss your hibernating representatives. But what they do not see, they shortly cease to remember.

Your competitor, on the other hand, adopts a different policy. His salesmen continue to contact this management, not with the hope of making sales but of rendering a helpful service. To help them get more output from the equipment that they have sold them in the past or from the limited amount of materials or supplies that they are now permitted to ship them.

These salesmen maintain their customary contacts with this management and make as many new ones as possible. They study the customer's problems in relation to how these may be solved by the knowledge possessed by the salesman or accessible to him. Next time one of these salesmen calls on his customer, he is going to have something to give him. He is going to earn good will by helping him. And let's say that he keeps on doing that for the duration.

Which of these two policies is going to keep a company in business after this war? That of deciding not to bother your customer with calls until the war is over, or that of determining to give him real help while it is going on?

And don't tell me that your business is different. There is no product or service that has been sold or is sold today, from lead pencils to locomotives, where the knowledge that you have, or can get, cannot be put to constructive use. If there is, you don't belong in that business. Either it is no good, or you are.

John H. H. H. H.

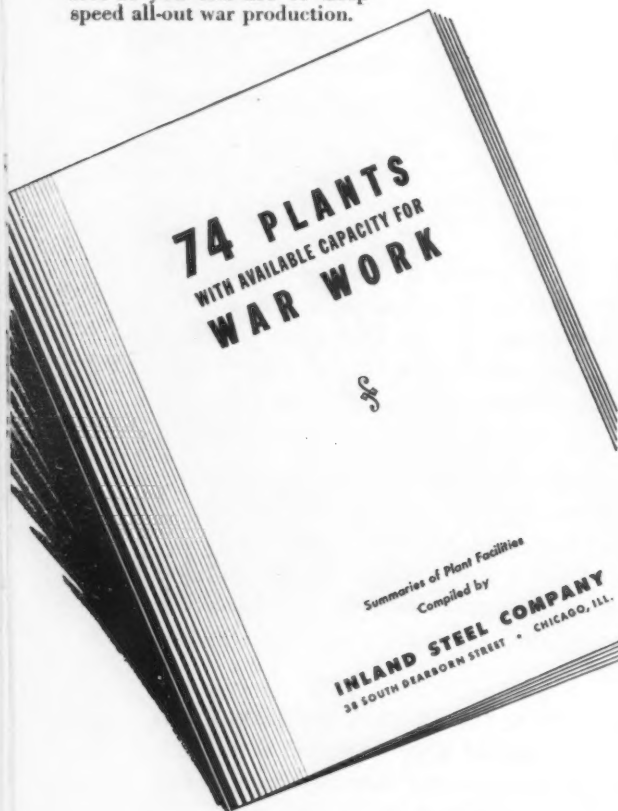
New Booklet of Plants with Capacity for War Work

Many contracts have been placed as the result of recent Inland advertisements which list plants with machinery and men available to produce for war. These listings are now ready in booklet form. If you are looking for metal-working plants to handle war contracts or subcontracts you will find immediate use for this Inland booklet.

The companies listed have had their normal peacetime business suspended or greatly curtailed. They are successful companies that are ready and anxious to turn their equipment and trained men to war effort. Most of these companies are located in the Middle West; many are long established firms, known throughout the world, and with experience in war work.

The following new summaries are typical of the comprehensive method of listing in this helpful booklet.

Write, phone, or wire today for as many of these Inland booklets as you can use to help speed all-out war production.



Look over the facilities shown in the columns to the right. They are new—received after the Inland booklet went to press. Inland will gladly give you the names and addresses of any of the companies in which you are interested.

IS-86 Ill. mfr. of cans, specialties and pierced tin ware, 200 emp., 160,000 sq. ft. fl. sp., own loading platform. Served by 12 railroads. Equip. includes: 22 bumping horn presses, 3" and 5" dia., 8" to 20" length; gang slitters; square shears; tread rolling mach.; 8" to 22" swing, 24" to 84" bed lathes; 4 drill presses; surface grinder; 3 shapers; 2 milling machines; spray booths; can line for 2½" x 2" up to 19" x 29" cans; and, 68 power presses for forming and drawing 0.010" to 0.105" metal. Has performed on contracts for Army and Navy.

IS-87 Ill. steel fabricator is ready to take on structural work. Have facilities for cutting bars, beams and angles squarely and accurately to size. Also for punching, riveting or welding. Carry a limited stock of angles, channels and beams available for quick delivery on fabricating orders with high priority ratings.

IS-88 Mo. mfr. of electrical devices desires subcontracts. Has 28 punch presses, 6 drill presses, 9 riveting machines, 3 welders, 5 tapping machines, 8 auto. coil winders, 42" power shears, 8' brake, good electrical research laboratory, adequate tool room. Established 18 yrs. 18,000 sq. ft. space.

IS-89 Wis. hvy. steel plate fabr.; over 50 yr. in business; 26,000 sq. ft. fl. sp.; 35,000 sq. ft. yard area; R. R. enters shop; 15-t. main crane 60 ft. span; precision flame cutting; 3 plate rolls #10 ga. to 1½"; apron brake 12 ft.; sq. shear ¾" x 10 ft.; throatless shear ¾" cap.; large punch 5 ft. throat; comb. punch & shear; horizontal drill 5 ft. radius; 10 welding machines; bar & angle rolls; riveting presses; 6 x 6 high speed hack saw; air grinding & polishing; paint spray; assembling; maintenance mach. shop; engr. staff; financially able. Production or jobbing work wanted.

IS-90 Ill. furnace & air conditioning mfr.; pl. fl. sp. over 105,000 sq. ft.; emp. 150; has two R. R. sidings. Equip. incl. shearing, blanking,

drawing, pressing, bending, punching, riveting, welding and surface grinding. Sheet steel working up to ¼" & hvr. Comp. cap. for war work contracts.

IS-91 Minn. mfr. of furnaces, heaters, and air conditioners, emp. 100. Has had experience with war production. Factory sp. 75,000 sq. ft. on own R. R. siding. Complete sheet metal production equip., including punch presses, power brakes, folders, shears, crimper; welding, painting and finishing equip.; mounting dept. Machine shop, including lathes, grinders, drill presses, saws, milling machines and shaper.

IS-92 Nationally known Ind. farm mchry. mfr. with capable engr. staff and 250 emp., modern plant—over 100,000 sq. ft. fl. sp., with additional 70,000 sq. ft. for whse. storage. Large machine shop with sheet metal and wood working depts., tool room, assembly, painting and shipping, gray iron foundry available.

IS-93 Wis. fab. of struc. steel and plate work. Desires war work, begin at once. 30,000 sq. ft. fab. shop, blacksmith shop, templet shop with facilities for punching, shearing, forming, bending, riveting, electric welding and acetylene cutting equip. 32 yr. expr. in light, heavy riveted and welded structures and plate work.

IS-94 Pa. gear and mach. mfr. has available capacity on 54" bevel gear planer and rougher. Have been cutting large bevel gear rings for Army.

IS-95 Ohio mfr. with facilities for iron, steel and wire fabrications desires war subcontract work. 350,000 sq. ft. sp., two R. R. sidings; 56 yrs. exp. Financial stability (highest commercial rating obtainable). Primarily interested in units or parts of units fabricated from angles, flats, tees, rounds, squares, sheets, strips, plates, etc. Equip. incl.: punch presses, power brakes, shears, spot and arc welders, drill presses, bull dozers, auto. saws, heat treating furnaces, tool room equip., etc.

*Dedicated
to Victory*

INLAND STEEL CO.

38 S. Dearborn Street, Chicago

Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City

By CORNELIUS M. COSMAN

Steel Chromizing

... Chromizing completes the chain of scale and corrosion protecting devices. It stands between plating and alloying, possessing its own advantages. Here is a survey of practical methods of chromizing and a full description of recently evolved processes.

THE formation of a corrosion resistant case when a steel part is heated in chromium powder for an extended period in a manner similar to carburizing, calorizing, or sherardizing was described in a short article in THE IRON AGE, March 12, 1936. Cooper Products, Inc., Cleveland, had developed this process on the basis of inventions and patents of Floyd C. Kelley of the General Electric Co. Considerable direct economies and raw material conservation were claimed by this company for the process, which was said to produce a case 0.005 in. in depth in 1 to 2 hr. at 1850 deg. F. on finished mild steel parts. At the time it was intended to keep the process out of competition with stainless steel and confine it to special applications where new combinations of properties were looked for. But the claim was that stainless alloys would be displaced at a later date on a price basis and tin plate could perhaps be displaced on a quality basis in many instances. Mass production costs were estimated at 4c. per lb.

Interest in Process Revived

However, after this initial surge of interest, the possibilities of imparting corrosion resistant casts by chromizing subsided and the method was completely neglected, until very recently, when Irvin R. Kramer and Robert H. Hafner presented a paper on this subject at the A.I.M.E. meeting in Cleveland,¹ which generally concurs

¹ See THE IRON AGE, Oct. 22, P. 44.

with the results obtained abroad in experiments on chromium diffusion into steels.

Germany, short of the strategic materials of war and in desperate

need for them, has gone a long way toward developing the possibilities of this process. The recent and practical method of depositing the chromium by means of gaseous chromium chloride was developed by Daeves, Becker and Steinberg in Germany and by Izgaryshev and Sarkisov in Russia. References may be found in German publications regarding this process and there are many special chromizing steels as well as equipment. The chromizing industry in Germany seems to be quite similar to the carburizing industry in the United States.

Both in this country and in Germany the realization that chromium and Cr-Fe alloys are highly resistant to corrosion, led to the desire to apply these properties for the protection of steel surfaces. Chromium electroplating has been developed to such an extent that it now offers a good protection against mild corrosive stresses over limited periods. But, then, other metals must be deposited between the steel and the chromium electroplate to lessen the discrepancies in the physical properties and to obviate rust formation through the ever-present pores in the chromium coat, which would cause a subsequent loosening of the protective cover. Results are more favorable when rustless alloys are coated onto the metal surface, since often by limited diffusion a small intermediate zone is created.

As L. Guillet has pointed out, mixed crystal formation is the prerequisite for diffusion processes. Furthermore, diffusion is supported by metals in the atomic state; even the finest mechanically produced powders are still infinitely removed from the atomic state. Therefore, diffusion in technical processes will always be carried out by the action of a gas upon a metal.

In carburization it is the Fe_3C -Fe mixed crystal which makes possible a high carbon surface and a steadily decreasing carbon content until the core composition is reached. The vapor pressure of carbon is too low at feasible temperatures, and therefore the carbon atoms available are too few, to produce a case within a practical space of time. Therefore, for speedy cementation at low temperatures, gaseous compounds of carbon are used.

Similarly, Cr and Fe form an uninterrupted series of mixed crystals and when it was attempted at first to obtain a chromium-rich surface layer by heating parts in chromium powder or ferrochrome under the exclusion of air, unsatisfactory results were obtained. Very high and sustained temperatures were required and this approach was given up by German metallurgists.

A compound of chromium had to be found which would be volatile and could easily replace iron in the crystal lattice. This com-

pound is chromium chloride, CrCl_2 . It is produced easily, is a vapor at comparatively low temperatures and the chromium atom can be displaced by Fe. Therefore, the chromium can take the place of the iron in the crystal lattice.²

²Becker, Hertel, Kaster, *Z. phys. chem., Abt. A*, vol. 177, 213 to 223.

The first experiments with chromium chloride were performed as shown in the assembly diagram in Fig. 1. A hydrogen current is bubbled through concentrated hy-

drochloride and conducted over ferrochrome after drying (H_2SO_4 and CaCl_2). An adequate amount of CrCl_2 gas is formed, and no improvement was noted when chromium metal was used instead of ferrochrome. The gas current, charged with chromium, then meets the steel test piece, where the chromium atom displaces one Fe-atom in the crystal lattice under formation of a substitute mixed crystal. The more volatile FeCl_2 which results is driven off, so that there is always a reacting surface. The process is arrested after the formation of a mono-atomic surface layer of chromium atoms, but if the temperature used is sufficiently high, the chromium atoms migrate off into the core by virtue of a concentration equalization, and new iron atoms come to the surface. By this change, wide chromium-rich iron zones are slowly created, in which

the chromium content ranges between 35 per cent on the surface to 0 per cent about 0.004 in. inside the steel part. Fig. 2 shows the chromium concentration curve.

Figs. 3 to 5 show microsections of the chromized parts. Fig. 3 is etched in nital and shows the structure only up to the limit of corrosion resistance. A surface layer is simulated by the sharp line of demarcation between the corroded and corrosion-resisting material. This line lies at 13 per cent chro-

mium and is the corrosion step value. It has physical and chemical importance only, because corrosion can take place above, but not below that line. Fig. 4, etched in a reagent for stainless steel, shows also the structure of the diffusion zone rich in chromium and demonstrates clearly that not a surface layer, but a diffusion zone, that is a case, is present. Since the limiting resistance runs right through the ferrite grains, the boundaries of the core structure merge with the grain of the case. If immersed in boiling nitric acid, the base material and the diffusion zone are dissolved up to the limiting chromium content, while the zones with chromium contents above the step value are not attacked (Fig. 5). Interesting to note in the micrograph, is the approximate repetition of the secondary curve in Fig. 2, i.e., from about 13 per cent chromium and

Base Metal's Role

The influence of the base metal upon the formation of the chromium-diffusion zone was then investigated. It was known that the depth of penetration becomes smaller with an increasing carbon content in the steel. As far as possible, material of less than 0.1 per cent carbon should be used. While the low carbon contents gave an agreeable depth of case, no guarantee for lasting corrosion protection could be obtained. Steels with an apparently sufficient case corroded in extended testing, and the diffusion zone was brittle when the base material was removed. The truly corrosion-resistant zones were found to be rather pliable. Extensive research revealed that the case is influenced not only by the percentage carbon content, but by the total carbon in the base or cross-section. During the infusion of the chromium into the surface of the part, the carbon, due to its affinity for chromium, advances from the center and meets the chromium atom. The carbon drainage is greater the higher the percentage of carbon in the steel, and the wider the cross-section. Even in comparatively low carbon steels, chemically and physically favorable diffusion zones were no longer possible when the cross-section of the part to be treated exceeded a certain thickness (about 0.040 in.). This difficulty is overcome by the addition of elements which prevent carbon mobility, such as titanium, molybdenum and manganese.

Just as carburizing requires certain special steels developed for the purpose, so chromizing demands special materials which assure the formation of an adequately deep, tough and corrosion-resisting diffusion zone. Steels with tensile strengths between 45,000 and 130,000 lb. per sq. in. can be had for heat treating in Germany, for creep resistance or other special applications. High tensile steels are naturally not high in carbon, but are produced—just as welding steels—of other elements which will not influence chromizing adversely. Table I shows the properties of a number of special chromizing steels. They are called "IK" steels in German be-

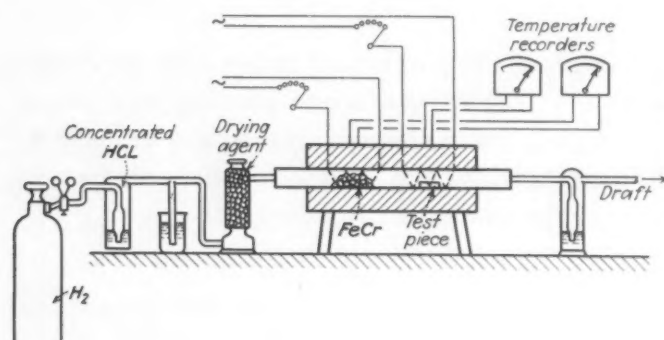


FIG. 1—Laboratory arrangement for the diffusion treatment of steel with chromous chloride.

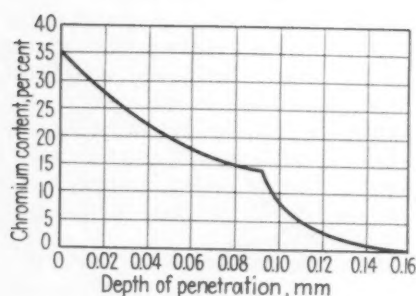


FIG. 2—The chromium content in the surface layer of a chromized steel test piece related to the depth of penetration.

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cause of the name of the process (Inkromierung).

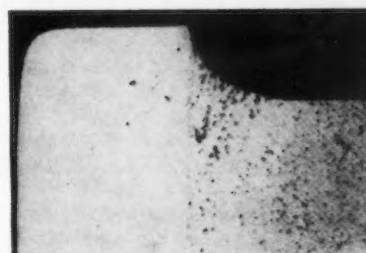
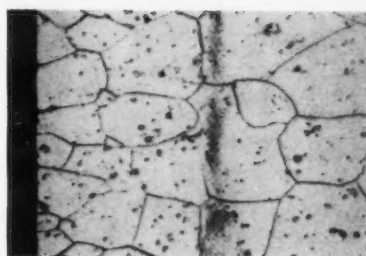
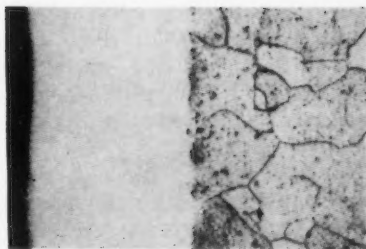
Commercial Process

Laboratory experiments had made it clear that it was possible to combine an adequate degree of chromium infusion with a comparatively low temperature and a reasonably short time for treatment, and that furthermore a good quality case could be infused into special steels. A pilot plant now had to be set up. A small, horizontal, cylindrical furnace was used with a chromizing compartment about 25 in. long and 5 in. in diameter. This furnace was not thoroughly satisfactory, but proved the industrial feasibility of the process. To comply with operational conditions, the HCl was taken out of pressure bottles as they are commercially used and a flow meter measured the gas consumption.

Next the process was tested in a horizontal retort with an effective space of about 10 ft. by 11½ in. in diameter. Tubing was charged into this furnace. Fig. 6 shows the plant and the closing device with gas inlet connections on the side of the retort. Here considerable difficulties were encountered due to the weight of the chromium chloride vapors. It was found impossible to impart an even case to the tubes, but when they were packed in ferrochrome, an even case was easily attained throughout.

In a vertical shaft furnace a better distribution of gases is assured. The furnace has a useful retort space of 13 ft. by 18 in. in diameter. Ferrochrome is placed into a basket at the top. Its weight and guide plates insure an even passage of the gas past the charge, which is given an excellent case.

During the operation of the pilot plant, the idea gained ground of separating the chemical, chromium chloride generating, stage from the actual treatment. CrCl₃ is the most suitable compound for the chromizing treatment. This salt is solid at room temperature, but so deliquescent as to be unsuitable for industrial operations. A ceramic substance which can be thermally enriched and activated with CrCl₃, either in vapor form or in aqueous solution, depending on the structure of the ceramic, was used as a stabilizing agent. Not all refractory materials were equally suitable: The usual sands,



FIGS. 3 to 5—Structure of steel after chromizing (magnification 250 times). Fig. 3 shows the steel etched in nital; only the structure of the base material is shown. Fig. 4 shows the steel treated with an etching reagent for stainless steel; the structure of the chromium rich zone is revealed. Fig. 5 shows the attack of boiling nitric acid with the resultant solution of the core material.

o o o

or alumina, magnesia or dolomite powders can apparently not be enriched with chromium chloride. The powder particle size also plays an important part in the diffusion process. By packing and heating mild steel in a suitable chromium chloride enriched ceramic mass, excellent chromium diffusion zones were produced. The deliquescence of the compound no longer plays an active part after it has been adsorbed by the ceramic mass. The regeneration of chromium chloride and its adsorption by the steel part proceed at the same rate. Excellent chromium diffusion zones can be obtained many times from the same powder. The life of the ceramic mass can be length-

ened by the addition of ferrochrome. Differences in the concentration of the retort gas can no longer occur, since the chromizing atmosphere is distributed throughout the space. The chromizing powder does not displace the gas chromizing method, but offers distinct advantages for many purposes. A furnace for its use is shown in Fig. 7.

These methods correspond to gas and powder carburizing. Also the liquid method is represented in chromizing: F. Bergmann's process³ uses a fused salt bath (Fig. 8). The choice of the process depends entirely upon the part to be treated.

³ German Patent No. DRP 677,113 3/9/34.

Has Unique Advantages

After all the basic problems of the process had been investigated, it became necessary to find applications in which the process would offer technical or commercial advantages, compared with other corrosion-resisting coatings, or alloys.

Chromizing is not meant to replace stainless steels generally. The process will be important only where alloying metals must be saved and where a surface with more than 30 per cent chromium is desired. Chromizing uses comparatively soft or weakly alloyed steels which permit easy hot and cold working. The workability of the base materials can thus be combined with a surface highly corrosion resistant. Stainless steel cannot compete in this application. The production of thin walled stainless steel tubes (0.02 in. wall thickness) is very expensive, but tubes from low alloyed, or unalloyed chromizing steels can be drawn easily and chromized afterwards.

Waste gas turbines must have a high creep strength and freedom from scaling. To unite both properties in one material has hitherto brought out other deficiencies. Chromizing offers a solution.⁴ The blade is made of a special creep-

⁴ A. Schuette, Z.V.D.I., 84, 1940, p. 615.

resisting steel and is subsequently chromized; chromium plating would not be satisfactory.

Chromized parts can later be subjected to cold deformation without loss in corrosion resistance. Chromized screws may have

the thread of a screw bolt rolled to 50 per cent before and to 50 per cent after chromizing. The work hardening of the surface is especially favorable. A chromized part corresponds in corrosion resistance to a steel with more than 30 per cent chromium. It is, therefore, better in many respects than other more weakly alloyed stainless steels, and even better than 18-8 steel.

Chromized parts have an excellent scale resistance. But at temperatures above 1475 deg. F. a slow diffusion of the chromium takes place, and the surface loses more and more chromium and scale resistance.

Generally, only finished parts are chromized in order to make all free surfaces corrosion resisting. Sometimes parts can be bent, rolled, pressed, or otherwise cold

formed, without loss of rust resistance (Fig. 5). Careful polishing of the surface is permitted although some of the case will be removed.

To combine chromized parts, electric resistance welding by the spot or roll welding methods or hard soldering with special solders have proved equally successful. In resistance welding, current and time have to be carefully adjusted so that no migration of the chromium-zone toward the core takes place, since otherwise at this point rust protection would be reduced. Fig. 9 shows an etched cut through two sheets united by roll welding. Fusion welding is not possible.

Chromizing is best for parts requiring corrosion and scale-resistance combined with lowest alloying additions, and particularly for such parts produced from semi-finished materials. This process stands between light and heavy plating on the one side, and corrosion resisting metals and alloys on the other.

Chromium Consumption

The chromium consumption amounts to 0.45 to 0.48 oz. per sq. ft. for the normal 0.0004-in. case thickness. The process operates practically without chromium losses and the maximum consumption, including a generous safety factor, amounts to 0.59 oz. per sq. ft. of surface. Best chromium savings are made on thick-walled parts. In containers considerable amounts of material can be saved. In the case of milk cans, for instance, the 5-gal. container requires 8 oz. chromium—including the safety factor, as compared with 3 lb. of chromium for chrome steel. If the body is made of chrome steel and the accessories alone chromized, then the total chromium consumption is reduced to 2 lb. of chromium. The chromizing process is interesting from the point of view of the metallurgist and economist, but it also emphasizes a development in technology generally which is outlined by Becker, Daeves and Steinberg. Construction parts are exposed to a variety of local stresses, that is the stresses on the surface of a part will diverge from those in the core. Technology early developed special processes to impart, at least after manufacture, specific properties to counter various local stresses. Chromizing is a new development along this line; it restricts a surface property, cor-

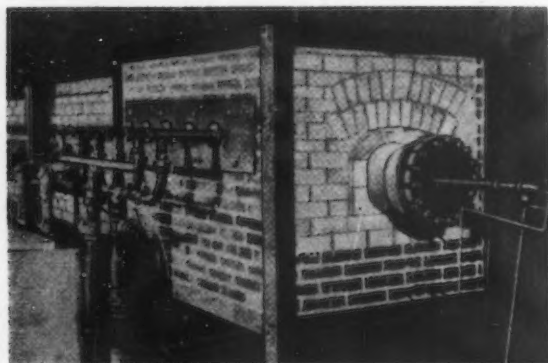


FIG. 6—Horizontal furnace for industrial use of chromium chloride gas.

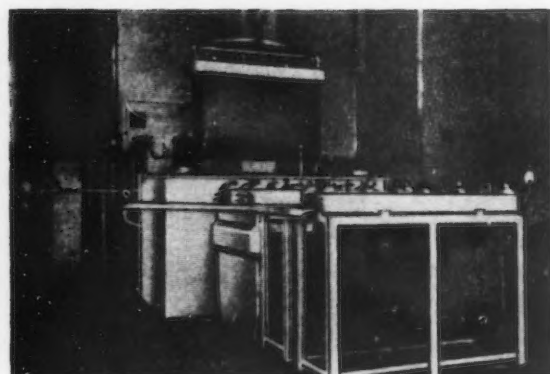


FIG. 7—Industrial chromizing furnace for operation with a solid activated mass.

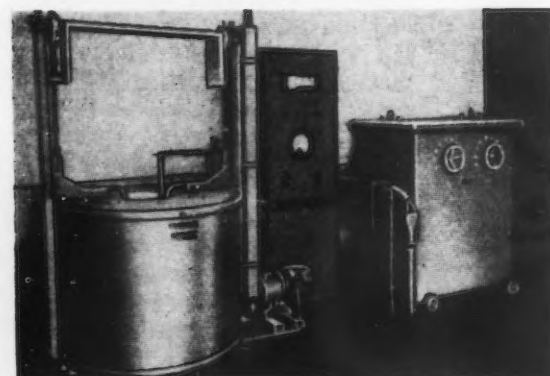


FIG. 8—Chromizing furnace for use with a fused salt bath.

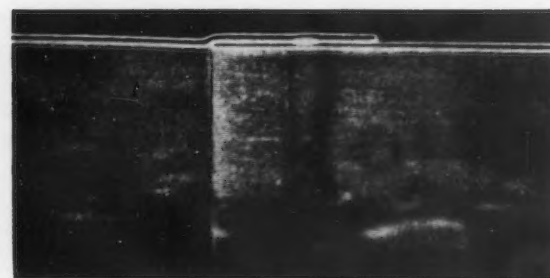


FIG. 9—Etched cut through two welded chromized steel sheets.

TABLE I
Properties and Applications of the Most Important Chromizing Steels

Group	Manufacturing Program	Tensile strength before and after chromizing lb. per sq. in.	Properties before Chromizing	Surface finish after Chromizing	Corrosion resistance of surface after chromizing	Purpose
IK N	Fine gage sheets, strips, seamless or welded tubes up to 0.04 in. wall strength	40,000—54,000	As deep drawing sheets or strip	As pickled stainless chrome steel	Corresponding to stainless, acid resisting steel with 30% chromium	Deep drawing parts of low wall thickness
IK 1	Rods, bars, profiles, sheets, wire, forged parts, seamless and welded tubes of any dimension	50,000—57,000	Structural steel	Mat silver	Better than IK N	Parts of all kinds of ordinary strength
IK 31	Rods, bars, profiles, sheets, wire, forged parts, seamless and welded tubes of any dimension	About 85,000 before about 114,000 after Chromizing	About as alloyed steel of equal strength	Mat silver	As IK 1	For parts of greater strength
IK 15	Rods, bars, profiles, sheets, wire, forged parts, seamless and welded tubes of any dimension	53,000—64,000	As IK 1	Glossy silver	Particularly high	As IK 1 where especially great corrosion resistance is required

rosion resistance, to the surface. It imparts a new property to the base material without altering its shape or dimensions. The corrosion resisting layer is inseparably connected with the base metal by a diffusion zone of stainless steel. Before this German process can be used, however, a great many difficulties must be ironed out.

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Creep Strength in Alloy Steels Traced to Zones

INVESTIGATIONS of W. Holtman, German metallurgist, recorded in *Stahl und Eisen*, indicate that carbon steels alloyed with either vanadium or molybdenum will show a definite zone of maximum and minimum creep strength between certain definite analyses ranges.

The experiment was conducted primarily to discover the effect of carbon content on the tensile properties of steels containing the above alloys when studied at temperatures of approximately 70, 900 and 1000 deg. F.

The results were shown in an unusual way by curves drawn through points of approximately equal creep strength, which are plotted on graphs with the carbon contents as the ordinates and the molybdenum or vanadium contents as the abscissae.

The contour diagram of the creep strength of vanadium steels shows an extended region in which a creep strength in excess of 4½ oz. per sq. in. at 900 deg. F. is encountered. This region extends from about carbon 0.05 and vanadium 1.2 to carbon 0.3 and vanadium 3.0. Near the borders of this region a more or less rapid decline in creep is registered, while a line of maximum creep strength traverses the length of the region.

This "summit line" is seen to extend without change in direction beyond the field of high creep strength into the regions of lower creep strength. A similar line of maximum creep strength is seen in the molybdenum-carbon creep strength diagram. In this case the line of highest creep strength extends from carbon 0.02 and molyb-

denum 1.5 to approximately carbon 0.35 and molybdenum 5.3.

When these summit lines are shown on the same graph as limit lines separating the regions of complete transformation, it is seen that they are close together and practically parallel. If, for the sake of simplification, it were permissible to assume that these two lines coincided, the following inter-relationship between creep strength, tensile strength and structure could be established: In the steels ranged to the left of the limit line, consisting of a mixture of martensite and ferrite, the diminution in critical cooling speed caused by an increase in carbon and molybdenum or vanadium content results in a disappearance of the ferrite and thus leads to a considerable increase in creep and tensile strength.

Magnesium and Its Alloys

By MAJOR C. J. P. BALL

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and
President, Magnesium Electron, Ltd.,
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MAGNESIUM is an element with specific gravity of 1.738, i.e. 60 per cent of that of aluminum. It was first isolated about 1860 by an Englishman, Sir Humphrey Davy. It is to be found in abundance across the earth's surface in the form of magnesite, which is mainly magnesium carbonate; as dolomite, a double salt of magnesium carbonate and calcium carbonate; as brucite, the hydroxide of magnesium; as magnesium chloride in brines; as carnallite, a double salt of magnesium and potassium chlorides; as serpentine, magnesium silicate; and in sea water, as a very small percentage of magnesium chloride.

As a direct result of the huge war program, there are a variety of processes now operating in the United States for the extraction of magnesium metal from the ore. These processes can be defined as electrolytic and thermal distillation.

Prior to the war the bulk of the magnesium extracted from the ore was produced by the electrolytic processes, and this is still the case today. The electrolytic processes mainly used are:

(1) The Dow process developed

by Dow Chemical in the United States.

(2) The M.E.L. process initially developed by I.C.F. in Germany and improved by M.E.L. in England, M.E.L. up to 1941 being the largest producer of magnesium outside of Germany.

Dow discovered initially that they had a cheap raw material in the $MgCl_2$ liquor residue from their brine treatments at Midland, Mich., and worked out a process to use this material. They discovered how to reduce it to an almost anhydrous condition by using dry hydrochloric acid gas and then developed a cell capable of electrolyzing this salt. At their Freeport, Tex., plant they recover magnesia from salt water using lime to precipitate the magnesia. This is then converted to hydrous magnesium chloride by the addition of HCl , reduced to the almost anhydrous condition and used as the electrolyte in the cells.

The M.E.L. process, which is that used by B.M.I. at Las Vegas, differs from the Dow insofar that this is a closed circuit process using completely anhydrous magnesium chloride.

The magnesite ore at Gabbs is beneficiated and calcined to a de-

gree which leaves a highly reactive MgO . At Las Vegas this is pelleted with carbonaceous material selected to give a high degree of porosity and fed into chlorinating furnaces in which the magnesium oxide is reduced to absolutely anhydrous $MgCl_2$, the electrolyte for the cells. The current splits the salt into the Cl_2 which comes off at the anode and is filtered and re-circulated and the metal floats to the surface at the cathodes and is dipped out. This metal, which can be as high as 99.85 per cent pure, depending on the skill of the operator, with the remainder $MgCl_2$ is taken to a refinery where it is cleansed and alloyed simultaneously, using special fluxes.

The first of the thermal distillation processes to produce metal on a commercial scale was that evolved by the Murex Co. of London, England. This process uses carbide as a reducing agent. The carbide and the dead burnt calcined magnesite are milled fine mixed in proportions of roughly 4 carbide to 1 magnesite and externally heated in special steel containers. At temperatures between 2200 and 2900 deg. F. the magnesium distills and the mag-

nesium vapor is condensed in a form of hood attached to the cylinder. This is cooled, the slag removed from the cylinder, and the crystalline metal from the hood.

The next distillation process, and one on which probably more capital has been expended than any of the others, is the Raden-thein or Hansgirk process, a plant for which has been erected at Permanente, Cal. Plants of this type have also been erected in England and Korea but so far none of them have achieved claimed performance.

The process which uses carbon as a reducing agent, if ever really successful, would probably be a cheap method of extraction since it employs the simplest formula $MgO + C = Mg + CO$. This reaction is reversible and requires very special equipment to achieve the temperature of 3650 deg. F. necessary to permit the reaction to the right. Very much lower temperatures are required for the backward reaction, necessitating rapid cooling of the magnesium vapor. This is effected by the use of large volumes of cold hydrogen or other suitable gas to chill the gases to approximately 400 deg. F. as they emerge from the furnace,

and the magnesium vapor should immediately condense out as a very fine dust, about 90 per cent metal. If the reaction does not work perfectly, or the impingement of the hydrogen be insufficient, the dust is re-converted to oxide, and the yields are very low. The dust itself is the most dangerous condition, for magnesium being so pyrophoric as to be almost explosive in character, and consequently it needs very special treatment to avoid accidents.

The method so far adopted is to re-distill in an inert atmosphere or under substantially reduced pressure. Large volumes of hydrogen are in circulation which require special apparatus for purification and re-use. To date the practical difficulties have precluded regular production on a substantial scale.

The next in order is the reduction of magnesium from dolomite using ferrosilicon as a reducing

agent. Much work has been done on this, particularly in Germany and in England before the war. In the former country a type of furnace has been evolved which permitted of a practically continuous production of 2 tons per day per furnace.

In Canada and in the United States the process suddenly became prominent as the result of the work of Dr. Pigeon. Dolomite of good quality is calcined, mixed with ferrosilicon and heated in tubes of stainless steel about 8 to 10 in. in diameter in a vacuum to about 2200 to 2550 deg. F. The heat is applied externally. The magnesium in the dolomite distills and is collected at the end of the tube where it condenses in crystalline form.

These processes have been described because they are those at present operating in the United States, and consequently of most interest. To date none of the thermal distillation processes has proved to have as cheap a cost of extraction as the electrolytic, and it will be most interesting now to see which of the two processes, Dow or B.M.I., will ultimately prove to have the lower production cost.

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THESE magnesium furnaces at the Wright plant furnish metal for engine parts.



The physical properties of magnesium are not sufficiently high as to permit of its use alone, except in such special cases as the use of its resistance to fluoric acid for chemical apparatus or containers. By careful alloying, the mechanical and physical properties of magnesium have been so improved as to make it available to industry as the lightest constructional material.

Applications can be classified as follows:

(1) For casting, where lightness or high specific tenacity is required (aircraft engines, aircraft wheels, transport vehicles, artillery wheels).

(2) For wrought materials, sheet, forgings, extrusions.

(3) For alloying with aluminum-base alloys, such as duralumin and the high-aluminum-magnesium alloys of 4 to 10 per cent magnesium content for high corrosion resistance.

(4) Pyrotechnic or other war purposes either in solid or powder form. As powder for flares and tracer bullets, or as containers for I B's.

Magnesium is hexagonal holo-hedral in its crystalline form. The melting point is 1200 deg. F.; coefficient of expansion at 68 deg. F. is 24.34×10^{-6} ; modulus of elasticity is 6.5×10^6 per lb. per in.²; modulus of torsion is 2.6×10^6 ; electrical conductivity is 37.8 per cent of copper standard; thermal conductivity is 44.4 per cent of the copper standard.

In the early days of magnesium development many people tried to discover alloys suitable for commercial development. A list of patents dealing with magnesium alloys and covering the period 1909 to 1937 gives particulars of approximately 3000 compositions; of these the great majority have proved to be valueless for practical purposes.

The alloying constituents generally used to effect general or specific improvements in the properties of pure magnesium are aluminum, zinc and manganese. Many others have been tried, but the remarks herein are limited to those in general use.

Aluminum is used as a hardener to improve the properties of Mg in the "as cast" condition, and to assist grain refinement. The castability of magnesium-aluminum

alloys rises with increasing Al content up to about 10 per cent of Al. In addition to being castable and giving good mechanical properties, these alloys are also suitable for extrusion and forging, those with content of 6 to 9 per cent Al giving high proof stress figures of the order of 34,000 lb. per sq. in. when forged and heat-treated.

Zinc further improves the castability of magnesium-aluminum alloys if limited to not more than 3 per cent. Additions of more than 3 per cent will lead to hot shortness and cracking, as well as to lack of pressure tightness. High zinc content is liable to create inter-granular voids, more commonly known as micro-porosity, and zinc addition should be kept below 3 per cent.

Alloying with Mn

Manganese is one of the most useful alloying elements. The solid solution has excellent corrosion resisting properties provided it is free from iron, probably due to the presence of an invisible film of $Mn(OH)_2$ on the surface which has a strong protective action and is reasonably robust.

Special processes have been evolved permitting the introduction of pure metal, and as a result the magnesium alloy containing only about 1.5 to 2 per cent manganese is the most corrosion resistant of magnesium rich alloys yet known, and has fairly good mechanical properties.

With magnesium-aluminum alloys, manganese has an equally beneficial effect in improving resistance to corrosion but in these cases the effective addition of Mn is limited to 0.3 to 0.5 per cent. The presence of Mn is also stated to improve the free cutting properties.

The primary advantage of the use of magnesium alloys for engineering purposes is their lightness combined with good mechanical properties. The best wrought magnesium alloys have mechanical properties similar to those of duralumin and therefore their low density, only 60 per cent of that of Al, allows much higher specific tenacity figures and hence to great weight saving potentialities.

Since the specific gravity is only 60 per cent that of Al, the use of Mg alloys having the same

strength will enable designers to attain a 40 per cent increase in specific tenacity, or alternatively, designers can make use of Mg alloys possessing only 60 per cent of the strength of the Al alloy used to achieve the same specific tenacity.

Specific tenacity is a figure obtained by dividing the tensile strength of the alloy by the specific gravity. Comparative specific tenacities for different metals are:

Mild steel	3.8
60-ton steel	7.7
Duralumin	9.5
Magnesium alloy	11.5

If sections are designed in magnesium alloy to have the same bending strength as duralumin parts, considerable saving in weight can be attained with slight loss in rigidity, but for equal weight, the strength is increased and, for some sections, the rigidity. The strength-weight ratio is always better for the magnesium alloy.

A further outstanding feature of magnesium alloys is the fact that they have an extraordinarily high machinability, which may certainly be said to exceed that of every other metallic material.

As has been stated, the modulus of elasticity is distinctly lower than for aluminum alloys. This quality has a considerable value in all cases in which a component is subjected to elastic vibrations, since for a given amplitude of deflection, the stress in the metal varies as the value of the modulus. Therefore, a given deflection in a magnesium component involves a lower stress within the material than in a corresponding part in aluminum. This may be of particular importance in parts subject to large amplitudes of "critical" vibrations, and the low value of the modulus helps a magnesium alloy part to weather the storm, where another part would fail. The low value of the modulus and of density also contributes to a substantial reduction or elimination of noise in magnesium alloy parts which are subject to vibration, such as gear box covers and covers for restricting engines.

Magnesium alloys have valuable fatigue properties and very high damping capacity, and these have been taken advantage of by the Germans and French in the de-

sign of artillery wheels, and by the English in aircraft landing wheels.

The initial attempts to persuade engineers to make use of magnesium alloys met with much resistance, since the fabrication and working of these alloys involved the solution of a number of specialized problems. These are mainly connected with certain inherent properties of the metal:

- (1) High speed of oxidation
- (2) Corrosion in the presence of chlorides
- (3) Difficulties in establishing satisfactory foundry practice
- (4) A tendency to directionality in forging and rolling processes.

Satisfactory methods of melting, fluxing and refining of magnesium, as well as the accumulation of substantial experience in the handling of the material, have overcome most of these troubles. Magnesium alloys are now being used in large quantities in a normal way by foundries and producers of extrusions, sheet and forgings. In addition, methods of surface protection have been so improved as to reduce to a minimum the effect of corrosive attack from external sources.

Magnesium alloys are being used satisfactorily both for sand castings and for permanent mold castings. They are also being used quite satisfactorily for pressure die castings.

Inhibitors Used in Casting

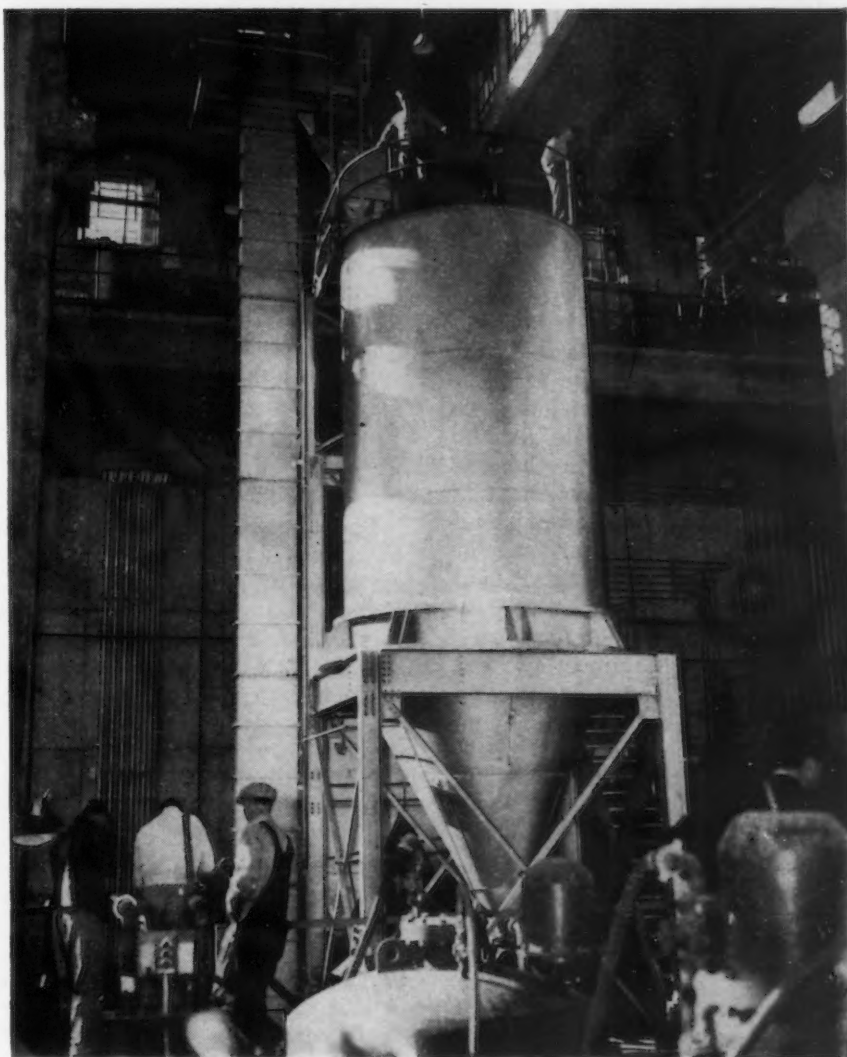
In sand castings, care has to be taken to use inhibitors and those most generally used are additions of sulphur and boric acid. When these additions are made and the sand is sufficiently porous to provide for escape of gas, magnesium alloys can be quite successfully cast into green sand molds, and it is also possible to use green sand cores, although the more usual practice is to make the cores of a silica sand bonded with an oily or plastic bond.

Owing to the low density of magnesium alloys, the feeders and risers must be high, to give the necessary feeding pressure and, in order to avoid micro-porosity, feeding must be everywhere available where much contraction demands it. Magnesium castings,

ing arrangements, in order to get feed metal to the point at which it is required, without causing it to traverse the rest of the mold en route.

Chills are freely used in magnesium alloy sand casting, to improve the texture of the casting

research work has been done on their deformation, which has been found to exhibit certain peculiarities. The hexagonal space lattice of magnesium is like that of zinc, which it somewhat resembles in its deformation behavior, and does not resemble that of alu-



THIS giant retort is used for refining magnesium at the Permanente, Cal., plant.

consequently, have a large number of risers and elaborate feed-and to insure a small grain size where a large mass of metal might otherwise give rise to a large grain. To protect the stream of molten metal during pouring, as it is entering the mold an inert atmosphere is formed by dusting sulphur dust over the surface.

The alloys of magnesium are good working materials and a considerable amount of interesting

minum, which is face center cubic, and is inherently more ductile.

In working magnesium, great care must be taken to avoid preferred orientation. Of the crystals the working technique established must, therefore, at an early stage take account of these facts.

While it is clearly desirable to obtain the maximum amount of deformation, the rate of application of deformation is a matter of great importance. Experience has

shown that deforming forces should be applied slowly. If this is done, larger rolling and forging reduction can be imposed and mechanical properties are improved. Annealings or reheatings must be suitably spaced so that working effects do not become too severe, and the temperature of working carefully controlled.

In commercial practice, rolling speeds of between 15 and 80 ft. per min. are used according to the type of alloy and extrusion speed of between 5 and 40 ft. per min. It is most important that temperature and rolling reduction are so balanced as to give the minimum grain size.

Magnesium alloys can be machined astonishingly freely and without lubrication. It is possible, for example, to machine a British Government D.T.D. type test bar 1 in. in diameter to finished form 0.564 in. diameter, parallel portion ready for pulling, with the one cut. For this operation the test bar is rotated at a speed of about 3000 r.p.m. and the total time for machining the test bar is about 60 sec.

In commercial practice, the machining of magnesium alloy components may be assisted by jets of compressed air to keep the cutting edge cool. The fire risk is small, provided that the cutting tool is kept sharp and that heat is not allowed to develop by friction.

As a result of the war and the great shortage of magnesium, commercial applications have stopped and the chief use of magnesium alloys today, other than for I. B's, is for supplying parts for airplane motors and frames. Examinations of crashed German aircraft disclose that the application of magnesium alloys, both cast and wrought, in German aircraft is very considerable.

Many undercarriage parts, such as the radius rod coupling, the back stay, the undercarriage main spar bracket and the tail wheel fork are used on the Heinkel III. All these are magnesium-aluminum alloys containing 9 to 10 per cent aluminum. The Heinkel III also has many fuselage fittings, such as the aileron control, the fitting carrying the tail plane, the seat raising control and welded tanks for oil or hydraulic fluid. The M. E.'s 109 and 110 contain

many magnesium parts and much magnesium sheet; for instance, the instrument panels and undercarriage fairings and bearers which are large forgings in an alloy of 8 Al, 4 Zn and 2 Mn. The J. U. 88 contains many parts, including the main undercarriage mounting and retracting brackets, the rudder pedal and all the castings in the control system, including the control stick, universal joint links and hydraulic cylinders. All the magnesium parts examined were in good condition and no failures, other than those caused by bullets or crash, were observed.

Before the war, large quantities of magnesium castings were consumed by the heavy vehicle industry in Great Britain to lighten unsprung weight, massive castings being used for crank cases, gear boxes and back axle casings. One company went so far as to cast the whole of the front panel and the driver's cab in sections.

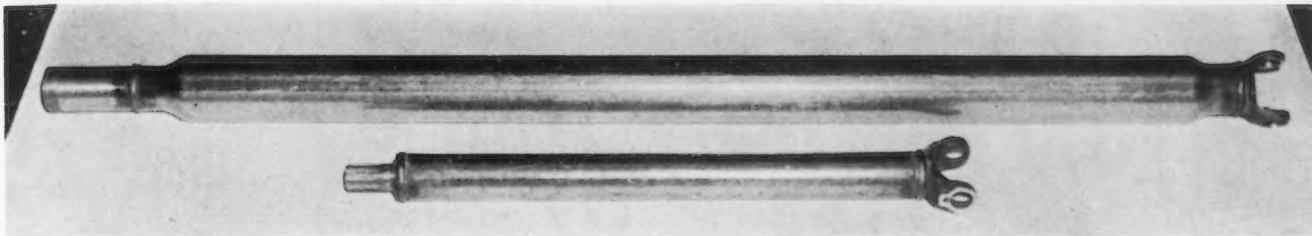
The cast magnesium alloy wheels have been adopted for practically all types of aircraft produced in Britain and on the continent, and this usage is steadily growing in the United States. In addition to the weight saving, combined with the rigidity attainable by the use of cast magnesium alloy wheels, there is another factor which is even more valuable at the present time. This big mass of metal, with good heat conductivity, provides for rapid distribution of the intense heat generated immediately by the brake blocks of landing aircraft. The heat generated in this fashion is so intense that many cases have been known of brakes seizing immediately on application with consequent destruction of tires. This does not happen with magnesium wheels, and the consequent saving in tires and rubber is not the least of the advantage to be gained by using cast magnesium wheels. A further good point in their favor is their high resistance to impact. Although thousands of large wheels are in daily use, there has been practically no case of failure by shock or impact on landing.

Owing to the shortage of rubber and the necessity to provide for guns traveling at high speeds over cobbled roads behind tractors, the Germans decided to use

wheels cast in magnesium alloy for their medium and heavy artillery. The resistance to fatigue and vibration is so great that these wheels, provided with only a small rim of synthetic rubber, stuck to the alloy rim by a special adhesive, were adopted and have been used satisfactorily by the German army throughout the present war. The French were adopting a similar type of wheel for their 75 mm. guns and had manufactured a large number just prior to the outbreak of the war. In Britain extensive trials were carried out with cast wheels, which on the test track stood up so satisfactorily as to outlast any other type of wheel, and the tests only ended by breaking of the axle of the gun limber, to which the wheels were attached.

In industry, magnesium alloy core boxes were used in many foundries for lightness and durability. Reciprocating and reversing revolving parts on high speed machinery where low inertia is of importance were called for, particularly in the textile industry, and an increasing number of applications were noted in the electrical industry. Assembly jigs of large dimensions were used in aircraft industry in the form of castings, as these combine the merits of rigidity with extreme lightness.

Considering the future, there will probably be general agreement that the tremendous development of aircraft during this war must result in an immense development of aircraft for commercial purposes post war. In this field, pay load will be the dominating factor. Operators of aircraft lines working on a write-off of five years, have calculated that the saving of an ounce in weight is worth \$7. With pay load saving as a predominant factor, designers and engineers not only of aircraft, but of all other methods of transport, cannot possibly afford to ignore the advantages of magnesium alloys, which offer a saving of up to 40 per cent over aluminum alloys, and on the assumption that magnesium alloys will be forthcoming with physical properties and at prices closely approaching those of aluminum, it is reasonable to assume that the magnesium industry of Nevada should have a fairly assured future.



SIMILAR to the ordnance products now being made of tubing from this mill, these De Soto and Buick universal drive shafts illustrate the severe service which oxyacetylene welded tubing withstands.

High Speed Tube Welding

By G. V. SLOTTMAN

Manager, Applied Engineering
Department,
Air Reduction Sales Co.

SINCE the first use of hollow logs as water conveyors in ancient irrigation systems, the manufacture of pipe and tubing has engaged the best efforts of engineering ingenuity, for as industrial development progressed on other fronts, new and important uses were found for this simple structural form. From its original function as a carrier of liquids and gases, tubing came into widespread use as a lightweight, high strength structural member, then as a power transmitter in the form of torque tubes, and for innumerable other purposes where maximum strength and minimum weight were essential requirements.

For most of these mechanical applications, tubing replaced solid cylindrical bars or shafts. In such solid members the core metal contributes the least strength per lb. of metal, particularly under torsion or bending stresses. Even as a compression member in many cases greater rigidity is secured by using a tube of larger diameter than the corresponding solid. Yet for precisely the same reasons that solid cylindrical members were originally used for these purposes—namely straightness and uniform distribu-

... Tubing formed from flat strip is being oxyacetylene welded at rates up to 200 ft. per min. in a preheating and welding torch length of only 4 ft. This article illustrates how automotive torque tubes are made by this process.

tion of metal—the tubing which was substituted had to be perfectly round and straight, and of unvarying wall thickness. Only thus could a torque tube rotate at high speed without whipping, or support a heavy load without buckling.

Diameter Concentricity a Problem

The problem in modern fabrication of tubing has been chiefly one of refining the manufacturing process to assure these characteristics of the finished product. Both seamless and welded tubing encountered their own peculiar problems. With seamless tubing the problem has been to eliminate eccentricity between inside and outside diameters, and thereby to secure uniform wall thickness. This difficulty has never

been completely solved, though in modern seamless tubing the eccentricity is reduced to a minimum. Welded tubing, using flat rolled strip, faced no such difficulty, but was not secure until doubts as to the strength of the weld were dissipated.

With present-day manufacturing controls, the oxyacetylene welding of tubing assures welds of the highest quality and strength, because of a combination of factors in the welding process. The most important of these are: A lengthwise extended puddle of molten metal; the surrounding of the puddle by an atmosphere which prevents oxidation; the maintenance of the puddle until all gases and impurities have escaped, and finally the compression

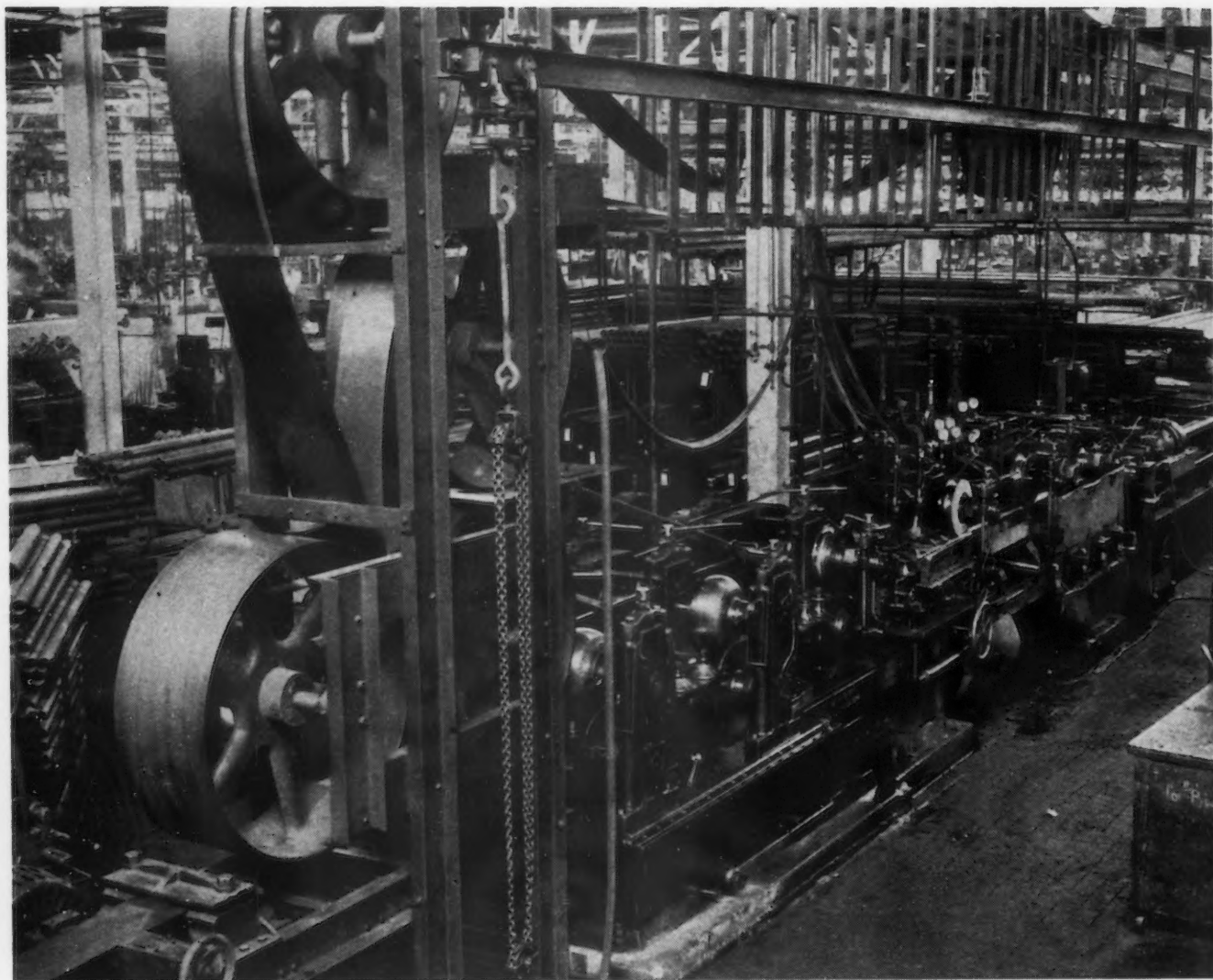


FIG. 1—Continuous tube welding mill, showing compensator loop of strip on overhead carrier, which is fed into mill while a fresh coil is joined to the end of preceding coil. Oxyacetylene welding is uninterrupted.

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of the plastic metal to produce a forging effect to refine the weld.

The most important mechanical requirements of the tube mill are that the forming rolls must be extremely accurate, and the welding head must permit of fine adjustment and control. The mill in operation at Mechanics Universal Joint Division of Borg-Warner Corp., now engaged wholly on ordnance production, offers an excellent example of how oxyacetylene welding is adapted to a precision process for high speed, continuous welding of tubing.

Strip Requirements Analyzed

Virtually any analysis of steel which is readily weldable by ordinary hand methods is suitable for welding on this tube mill. At present this machine is turning out tubing of SAE 1020 composition, containing 0.15 to 0.20 carbon, 0.30 to 0.60 manganese, preferably close to the higher figure, and small quantities of phosphorus, sulphur and

silicon. Considerable care in the rolling of this strip is essential, since the requirements call for a thickness tolerance of a few thousandths of an inch. It is also necessary that camber and "snake" be held at an absolute minimum, since excessive distortion may cause welding difficulties and prolong the final straightening operation. The maximum camber may not exceed $\frac{3}{4}$ in. in any 50 ft. length.

The width of the strip is approximately equal to the tube's neutral circumference, with variation according to the thickness of the material. It is furnished in continuous coils weighing 1500 to 4000 lb., and not over $3\frac{1}{2}$ ft. in diameter. The loading rack of the tube mill

accommodates two such coils, so that the second is immediately ready for butt-welding to the end of the first. Mill operation proceeds without interruption while this joining is done, feeding meanwhile on a compensator length of strip which is carried in an overhead loop.

Fig. 2 shows the stand of grip and straightening rolls through which the strip passes immediately after leaving the coil. These rolls are under spring tension to eliminate the effects of coiling in the strip. An electric shear is next in the path of travel, to trim and square the ends of both strips. These ends are butted together, held down with pneumatic clamps and welded by a special Airco cross-seam welder. This machine, shown in Fig. 3, has a cam-operated variable speed and carries a multi-flame welding tip. Since this welded section will later be cut out and scrapped, the quality of this weld need

be sufficient only to carry the incoming strip through the mill.

Slack Loop for Interruptions

Strip feed is interrupted during this end-welding operation, and in order that the mill itself may operate uninterruptedly a 240-ft. slack loop is held in reserve overhead. This is carried up a pulley column and across to a traveling pulley riding on a 120-ft. track, then back to the pulley column and into the mill. This loop is fed into the machine while the fresh coil is being welded to the tail end of the first coil, and is restored to its full length as soon as the new coil is released. The time saving which this device effects is greater than appears at first glance, for it eliminates shutdowns for laborious re-threading of new strip through the machine, or the precarious business of shutting off welding flames and re-starting on a half-finished weld. The importance of this compensating device cannot be overstressed, for by eliminating shutdowns and re-threading of strip a considerable increase in production is obtained, and spoilage is

totally eliminated except for the end-welded joint.

Free Forming by Rolls

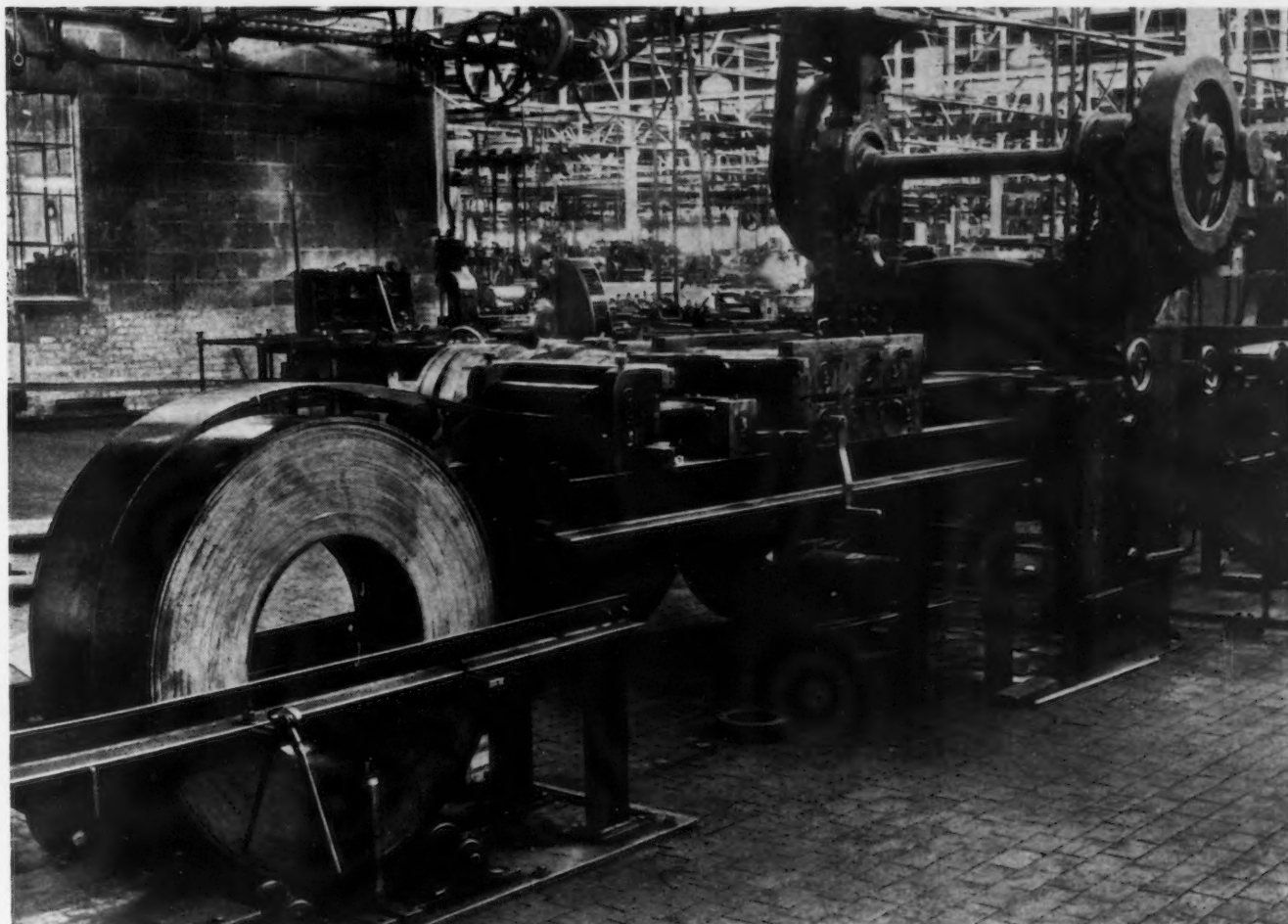
After the strip returns from the compensator loop it passes through a series of breakdown and forming rolls. A total of 10 pairs of rolls take part in forming the flat strip into cylindrical shape. This comparatively large number of rolls forms the strip in easy stages, so that there is no stretching of the edges. More important than the number of rolls, however, is their shape and placement. Forming roll systems have been made which introduced flat spots, imperfect roundness, or a continuous bow or sweep to the formed tube, either because the overall method was incorrect, or because the metal was stretched or compressed at certain points. The method of forming ap-

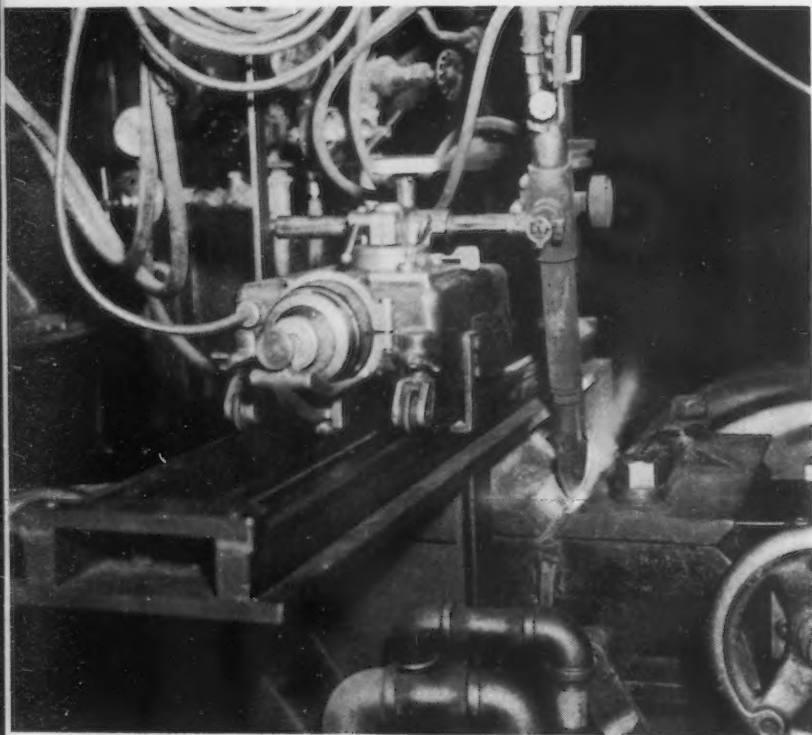
plied here is that of "free forming" in which the strip edges are formed upward while the center portion is depressed, such that the progressive transition from flat to round is accomplished without distortion, and a near-perfect cylindrical shape is produced.

The first vertical stand of breakdown rolls bends the strip into a shallow U shape. Three pairs of conductor rolls then begin forming the edges upward, and pass the strip to the second breakdown rolls which deepen the U, followed by four pairs of conductor rolls, shown in Fig. 5. These progressively force the edges inward until the circular shape is nearly complete. The final pair of rolls, having semicircular faces, complete the forming operation, and set the metal so that it holds its shape. From these finishing rolls the formed tube is conducted by a vertical pair of centering guide rolls to the welding unit. The upper guide roll has a center fin which parts the seam, holding it precisely in line for welding.

As the tube passes beneath the welding head it is supported by six

FIG. 2—Strip passes through a stand of straightening rolls which are under pressure to remove the effects of coiling. The shear at right trims the end square for welding to tail end of preceding strip.





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FIG. 3—Welding the end-to-end joint is done automatically by a special Airco cross-seam welder carrying a multi-flame welding tip, moving crosswise in relation to strip travel. This joint is later cut out and scrapped.

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pairs of horizontally positioned, internally water cooled rolls. These welding rolls, some of which are shown in Fig. 7, are individually adjustable as to vertical position, to control bowing of the tube because of longitudinal expansion of the weld. By progressively elevating and depressing the welding rolls, the tube passes beneath the welding flames in a controlled bow, sufficient to equalize the effects of weld expansion at the top of the tube. This device greatly simplifies the final straightening operation.

The internal water cooling of these welding rolls is so arranged that there is no steam formation, even though the lower portions of both tube and rolls are flushed externally. The fifth and sixth pairs of rolls are adjusted to compress the

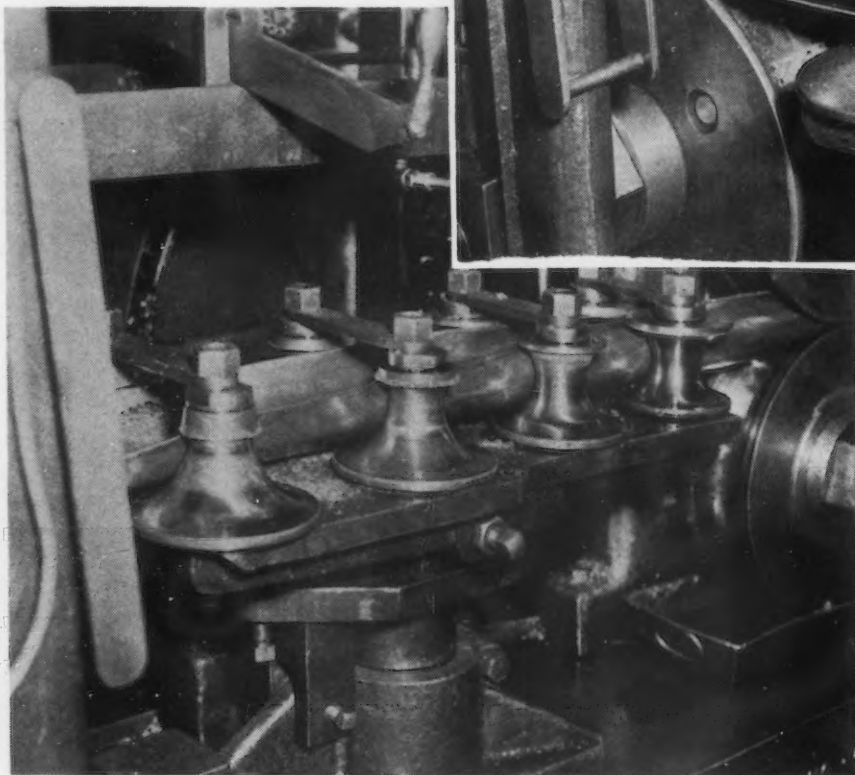
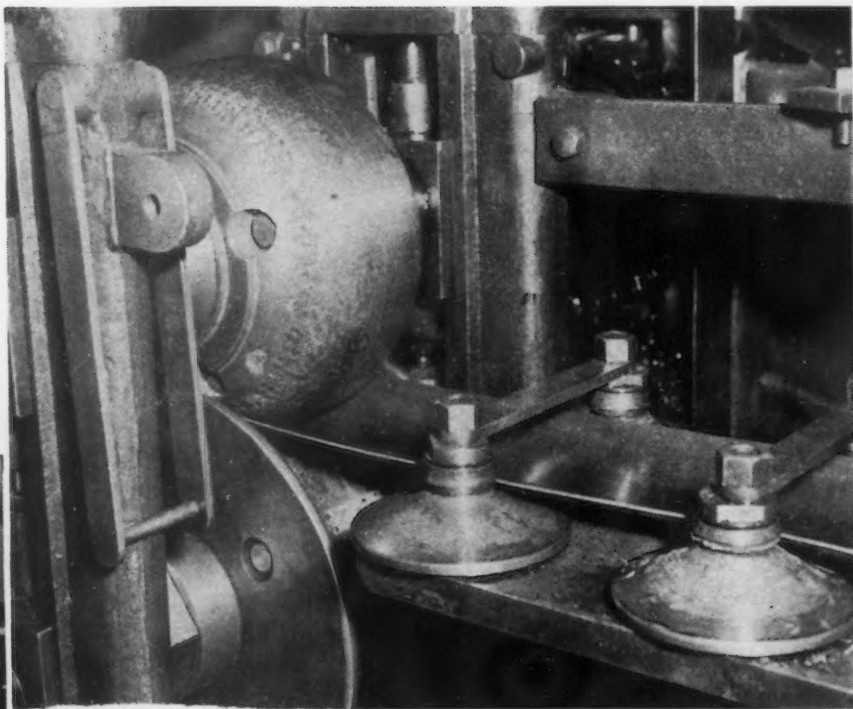
RIGHT

FIG. 4—The first breakdown rolls at left bend the strip downward into a shallow U shape. Conveyor rolls at right begin turning the edges upward gradually, and feed strip into second breakdown rolls which deepen the U.

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BELOW

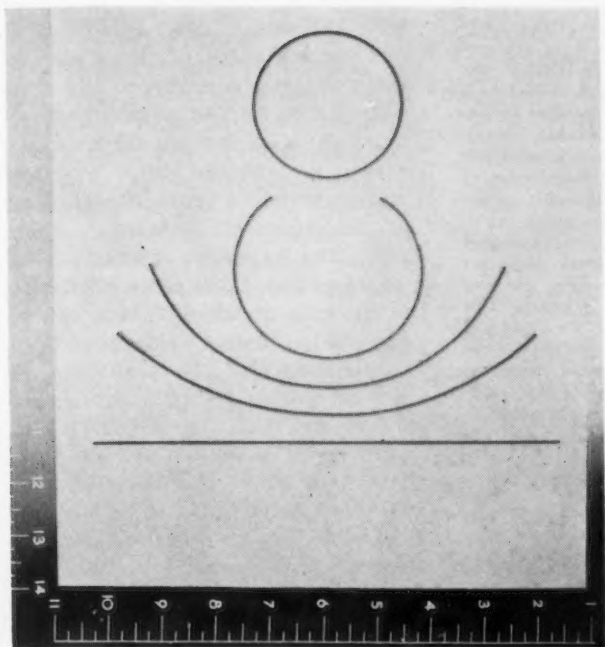
FIG. 5—From the second breakdown rolls, four pair of conveyor rolls bend the edges inward progressively and form the strip into nearly circular shape. Finishing rolls at right form it into perfect circle under slight pressure.



tube, which at this point is at the stage of solidification of the weld. This compression of the hot metal imparts a forging action which contributes to making the weld exceptionally strong and ductile.

Welding Head Details

The welding head itself is a two-torch, continuous unit, embodying an ingenious method of varying the proportions of oxygen and acetylene across the length of the head. This graduated-heat welding unit, developed by Air Reduction in 1922, represents the most important



LEFT
FIG. 6—These cross-sections show successive stages of formation of flat strip into round tubing. Note that bending is uniform at each stage.

single contribution to high-speed oxyacetylene tube welding, since it enables maximum utilization of the different flame characteristics of different gas mixtures during the preheating and the welding phases of operation, thus securing both higher welding speeds and a reduction in gas consumption.

The welding head is in two sections, each supplied by a separate torch and gas mixing chamber. The 81 flame orifices are distributed in such a way that the heat is concentrated first along two lines parallel to the seam and slightly apart from it. Two rows of flames pre-heat these areas so that when the following single row of flames comes to play directly on the seam, their heat will immediately fuse the edge metal without being conducted away into the adjacent areas. Fig. 9 shows the placement of the flames over the 25-in. length of the welding head. It will be noted in this picture that the single row of flames covers a fairly considerable distance. This is to provide intensely localized heating and maintain a long molten puddle at the seam, to insure thorough fusion throughout the full thickness of the metal, and to allow sufficient time for impurities and gases to escape.

From Oxidizing to Neutral Flame

Before following the tubing further along its line of travel, it may be interesting to digress on the operation of the gas mixing device. In the preheating section of the welding tip, gas flow is regulated to produce an excess of oxygen and

consequent higher flame temperature. These superheating flames permit the highest rate of preheating without danger of oxidation, since the metal at this point is not yet molten. The mixing of gases within this tip is graduated progressively so that each succeeding flame orifice consumes proportionately less oxygen, until at the end of the preheating section nearest the weld the flames are more nearly neutral and non-oxidizing.

The welding portion of the tip, which follows immediately behind the preheating section, is likewise designed for progressive variation of gas mixture in each succeeding flame. These flames may be con-



FIG. 7—Water cooled welding rolls hold tubing in position as it passes beneath the welding flames. Two torches supply gases to the welding head, which provides progressive variation of oxygen-acetylene ratio across the length of the head.

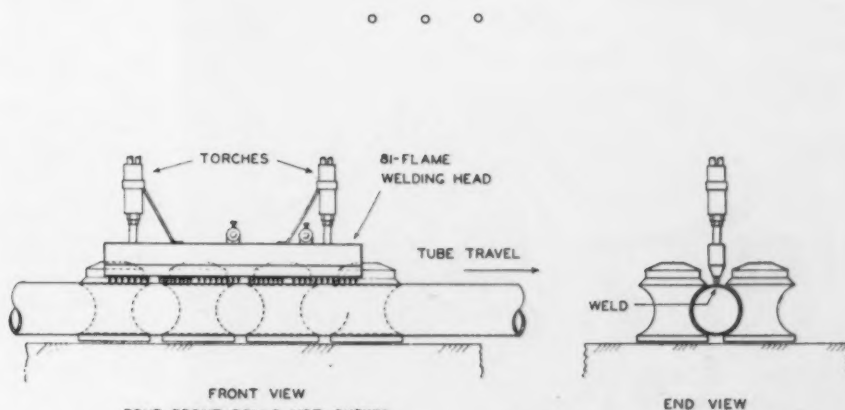


Fig. 8—Drawing showing relative positions of welding head, tube and welding rolls.



ABOVE

FIG. 9—Chief source of speed in tube welding is Airco's 81-flame tip which provides excess oxygen flames in preheating section at left, gradually approaching a neutral flame near the welding portion at center. The long single row of welding flames assures full-penetration welds, free from porosity.

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trolled by the operator at an approximately 1:1 gas mixture where the metal is melting, and at the final stage of welding the flames may be reducing, if desired, according to the analysis of the material being welded. Thus the distinction between the preheating and the welding sections of the unit is somewhat arbitrary, for the transition from excessively oxidizing flames to neutral or reducing flames is constant and gradual. It is this characteristic which renders this welding head superior to similar units which are limited to only

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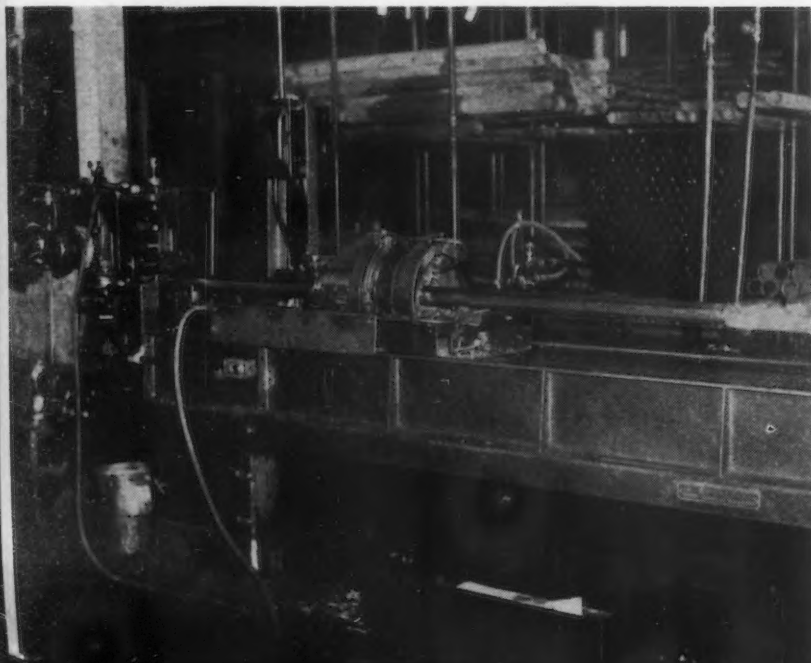
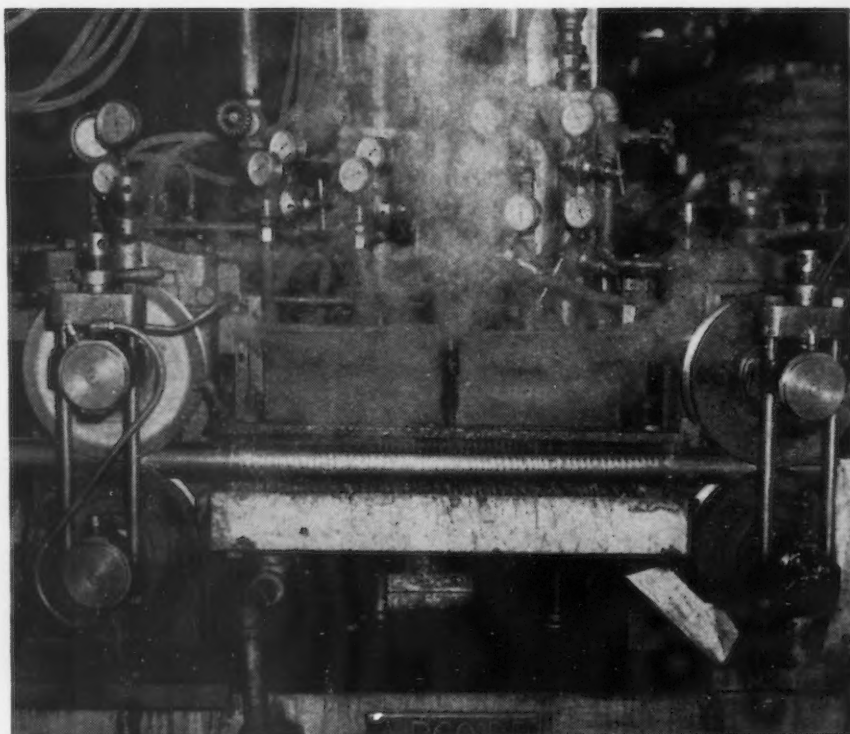
BELOW

FIG. 10—This is the first of two quenches, directing jets of water at both sides of the weld. After this partial cooling, the second quench impinges directly on the weld seam. This controlled quenching restores hardness lost in the welding process.

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two stages of flames for preheating and welding.

This flexibility of flame adjustment enables both oxygen and acetylene to be burned at optimum efficiency. Gas consumption is, accordingly, reduced to a practical minimum, which prevails regardless of the speed of welding. Apart from the practical limitations of machine size, there is no limitation to the rate at which tubing can be gas welded, using welding units of appropriate size. Several mills are in operation at 110 ft. per min., and one installation is welding light gage material at 200 ft. per min., employing a 4-ft. long welding head with 240 flame orifices.



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FIG. 11 — The finished tubing passes through a rotary cutoff which grips the tube and travels with it while cutting tube into lengths. Combustion gases issuing from the tube at the right are ignited after each cut.

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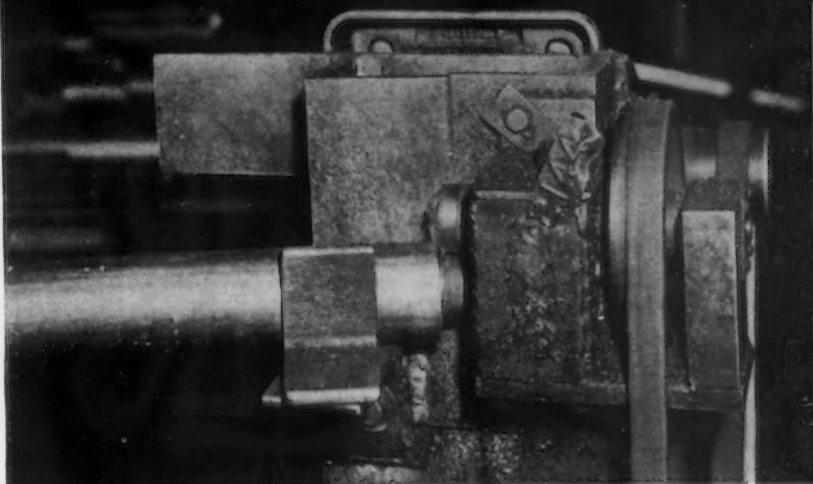
At these speeds the gas consumption per foot of tubing shows a definite decrease as compared to the slower welding speeds. This reduction is due partially to one of the characteristics of the gas welding process, the liberation of hydrogen from the combustion of oxyacetylene. This hydrogen burns freely within the tube, and serves effectively to preheat the metal before it reaches the welding unit. This envelope of hydrogen, incidentally, also serves to prevent oxidation of the weld, by blanketing the metal internally and externally as it melts, solidifies and cools.

Having completed the weld, the tube is carried by supporting rolls

which maintain pressure during solidification of the weld. The first water quench comes into play at this point, directing water jets on each side of the weld, but not directly on it, since this would cause excessive hardening. A limited re-hardening is effected by the controlled quenching, to restore some of the hardness lost in the welding operation. The balance of the orig-

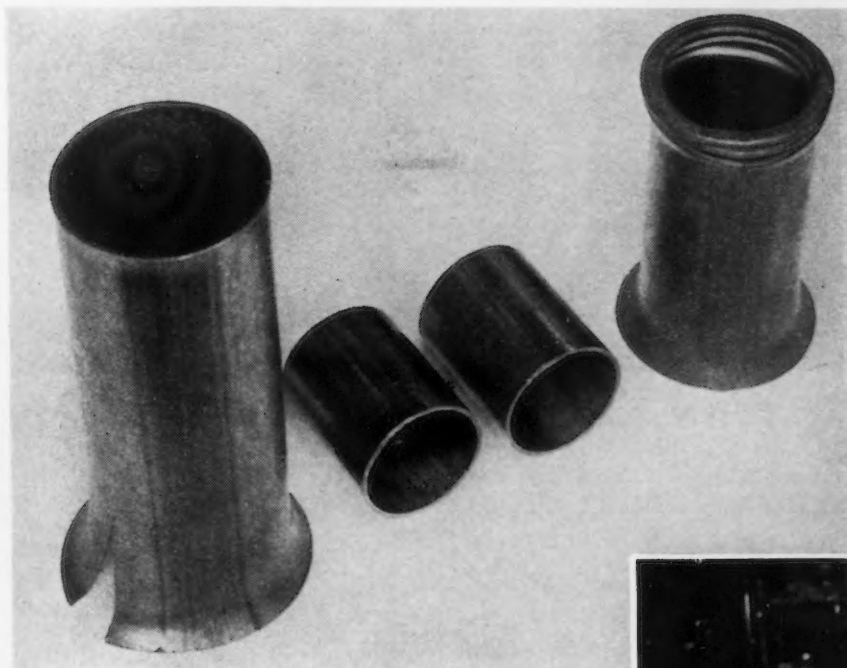
RIGHT

FIG. 12 The cut lengths roll to this burring machine which removes the burr at one end for insertion of mandrel on straightening machine.



LEFT

FIG. 13—These sections, cut from the tube before swaging, were tested between a plug and a tapered mandrel. Failure of piece at left occurred apart from the weld, which faces forward. Piece at right crumpled but did not split.



cutoff tool. Only one end need be de-burred mechanically, to insure easy insertion of a swaging mandrel.

At this point a manual test of the weld is occasionally made. A 10 in. section of tubing is placed over a tapered mandrel and ham-

inal hardness is subsequently restored by the swaging operation.

Another set of rolls then compresses the tube, accurately sizing its diameter and reducing it from 0.015 to 0.025 in. This step has a refining effect upon the weld and improves the strength of the metal throughout, due to the cold reduction. The second cooling quench precedes the final set of straightening rolls, which are vertically mounted and staggered to remove any tendency to bow or sweep. The tubing then emerges from the machine, straight to within commercial tolerances.

Cutoff Travels with Tube

The tubing is cut into measured lengths by a rotary cutoff which grips the tube as it passes through, and travels with it until the cut is completed. Combustion gases are kept ignited as they issue from the open ends of the tube, to prevent contamination of the atmosphere. The severed lengths of tubing roll by gravity to a burring machine which removes the burr left by the

RIGHT

FIG. 14—Every length of tubing is subjected to hydrostatic test before it goes to the straightening machine. This one, 0.083 in. in wall thickness, is successfully withstanding 3600 lb. per sq. in. water pressure.



mered with a sledge. Typical results of this test are shown in Fig. 3. Splitting of the tube generally occurs at areas other than the welded seam, but if the seam gives away, adjustments of running speed and welding flames are made to obtain a perfect weld. However, an experienced operator rarely needs this indication of weld quality, for he can judge quite accurately by observation of the molten puddle during welding.

The tube lengths, usually in multiples of the length of the final product up to a maximum of 15½ ft., are conveyed to a swaging machine of the hammer roll type. The tube is swaged over a mandrel until the inside diameter is exactly sized, the inner weld bead peened down, and the tube finished to perfect roundness.

For many purposes the tubing would be sufficiently straight after these operations. But for high speed torque tubing and other purposes it is put through a final straightening machine of the cross-axis roll type which straightens it to within a few thousandths of an in. per ft.

Tested Hydrostatically

Every section of tube is then tested under a hydrostatic pressure of from 1300 to 4600 lb., the variation being dependent upon tube diameter and wall thickness, and the specifications required. Not until each tube length has passed this test is it released for further fabrication. This mill has, on several occasions, tested the welded tube to destruction, the failures occurring at places other than the weld, at hydrostatic pressures of 6500 to 6800 lb. per sq. in. The

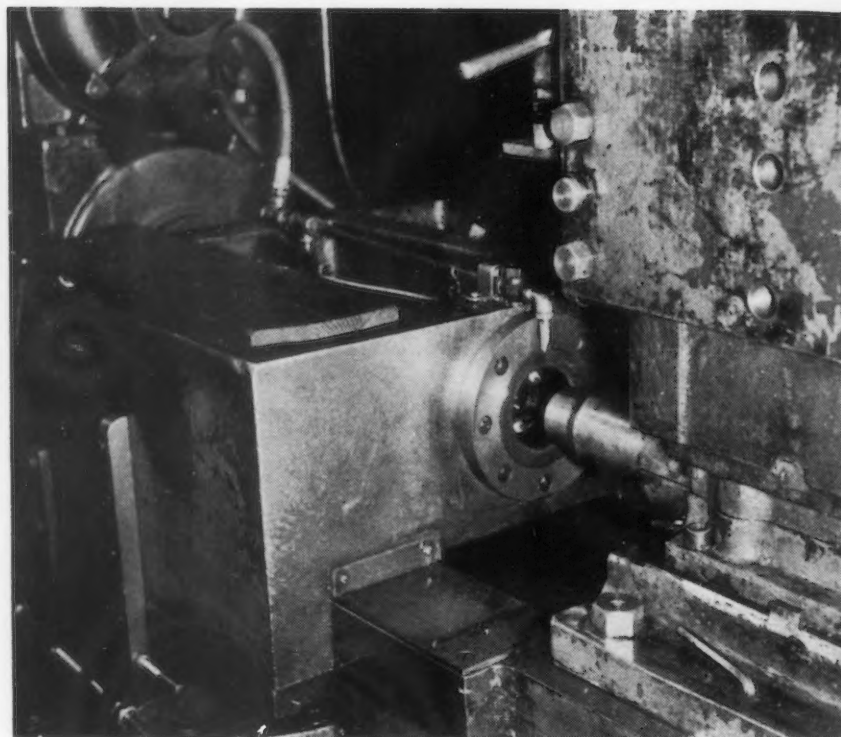


FIG. 15—This tube end has been swaged to smaller diameter to receive a joint fitting, which will be welded on electrically.

sizes of tubing made on this mill range from 2 to 3½ in. in diameter, with wall thicknesses of 0.065 to 0.095 in.

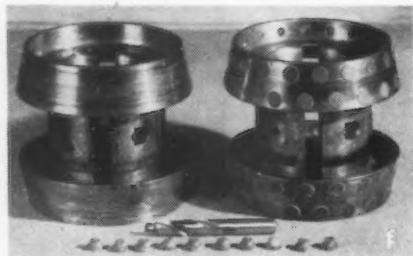
Upon completion of this test the tube is cut into the required lengths for final fabrication. The ends may be chamfered and swaged to smaller diameter if required to receive certain fittings, or the cut lengths may be sent to a precision straightening machine.

Such tubing is particularly suited for automotive torque shafts, for in addition to being straight along its linear axis, it is of uni-

form wall thickness, having been formed of flat strip originally. Both of these characteristics are essential for tubing which rotates at high speed under load, since under these conditions any unbalance of the tube would cause severe whipping action. Many thousands of miles of this welded tubing went into the making of automotive propeller shafts in peacetime. Similar tubing is now being used in far more rigorous assignments, as drive shafting in tanks, jeep cars, and other motorized ground equipment.

Micarta Inserts for Automatic Screw Machine Clutches

WEAR in the clutch body and the friction drive rings of automatic screw machines may be compensated for by an outward adjustment up to 5/32 in. from the friction backs. But as these friction rings are adjusted outwardly, wear also shows up in the threads. The result is a friction ring that chatters and grabs in changing from different speeds. Micarta inserts in the friction face of the



clutch body allows the friction rings to be adjusted back into the friction backs and in most cases this does away with the looseness in the threads. This repair makes a smoother and quieter operating clutch than the original brass ring, and it has been noted that less tension has been required to drive the spindle. Several such repairs in service for one to two years show no signs of wear.

Carburizing Compounds Reconditioned Automatically

By S. H. BRAMS

Detroit Editor, *The Iron Age*

... A new system is being employed in many armament plants to facilitate handling, reconditioning and blending of the large volumes of compounds used today.

HANDLING of carburizing compounds has always presented problems to industrial and maintenance engineers, as, for instance, the use of shovels or open-type conveyors easily creates dust, of a sort most harmful to electrical equipment, bearings and machinery. Reconditioning of the compound is required, presenting further problems. Finally, the reconditioned compound must be properly blended with new com-

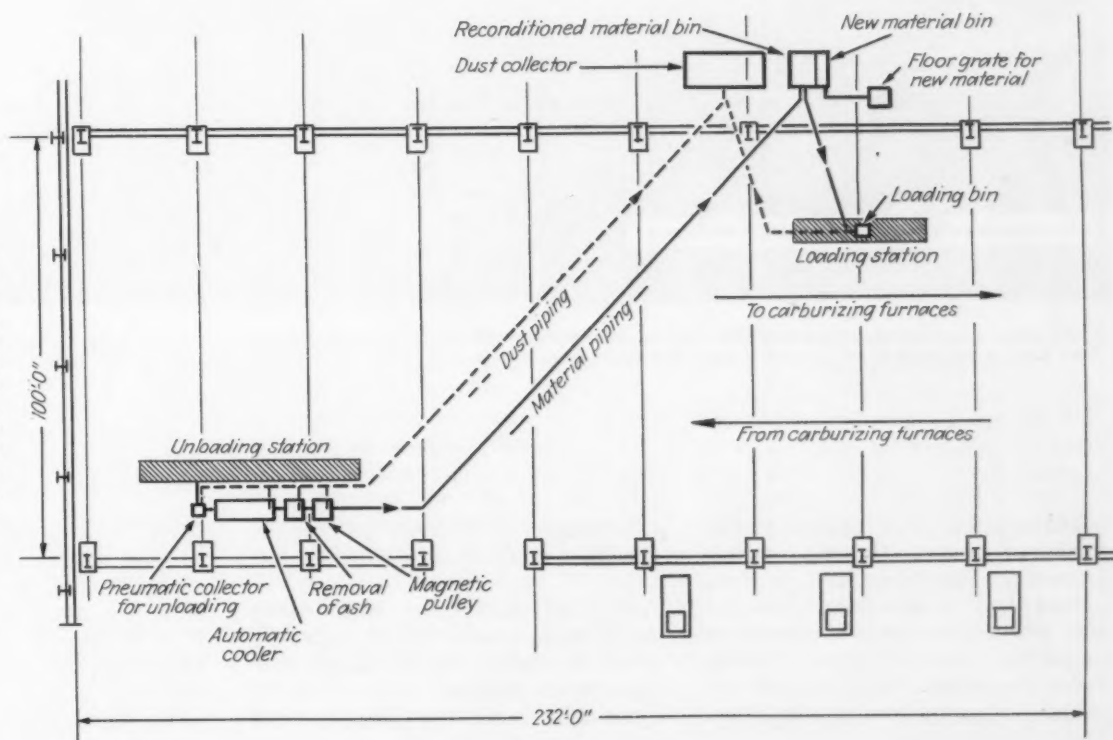
pound, and if this is done by the orthodox means of hand shoveling, screening and mixing on the open floor, it is subject to human error. Obviously, any such hand systems also require more labor than do automatic installations, and take considerably more floor space.

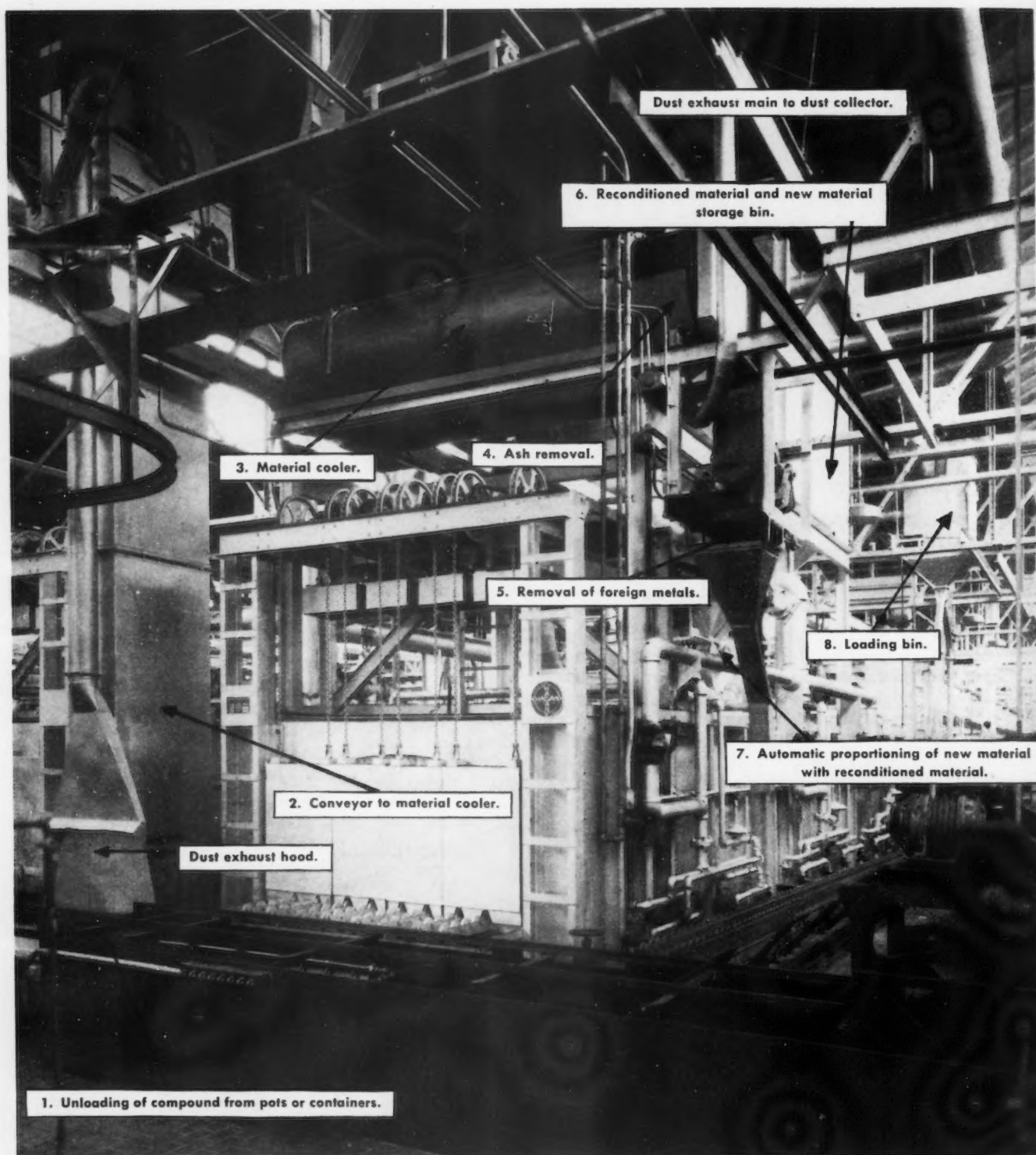
To solve these related problems, Newcomb-Detroit Co., Inc., has developed a complete system of automatic reconditioning and conveying carburizing compounds used in

processing steel parts and plates. Three major steps are involved. First, the system automatically conveys compound from the unloading station to the loading station. Second, it automatically reconditions the compound by cooling, removing the ash, removing foreign metals and mixing in proper proportion with new compound. Third, it controls dust conditions throughout the process. This type of system was pioneered by D. H. Baird, now an engineer with Newcomb-Detroit.

The usual installation begins with the dumping of compound, either hot or cooled, from the car-

THIS is a typical installation of the Newcomb-Detroit conveying and reconditioning system for carburizing compounds. This installation was designed for an armor plate mill. Systems spreading out as much as 250 to 300 ft. are not uncommon in installations of this sort.





THIS view, in a continuous heat-treating plant, shows an entire installation of a carburizing compound material handling system. Stages in the process are marked. It is notable that practically the entire system can be handled overhead, thus eliminating the need for floor space.

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burizing boxes into hoppers at the discharge end of the carburizing furnaces. The compound is then passed into a revolving cylinder with worm conveyor, and effectively cooled by a stream of water flowing down the sides. The end of the cylinder is perforated, so that when

the compound reaches this point, the light ash drops into a dust bin below.

Foreign metals are removed in an adjacent section of the conveyor when the compound is passed over a magnetic pulley.

At this point the material has

been reconditioned and is ready to be used again. It is conveyed to a reconditioned material bin which adjoins a new material bin stocked with fresh compound. Valve drops from each of these bins are controlled by pulleys driven by a small motor, and by the variation of these

pulleys, the ratio of the mixture can be adjusted as desired.

The properly mixed compound is then conveyed to small bins located directly over the loading stations, where the compound is dropped into containers. Small bins at loading stations can be kept automatically supplied with compound as desired.

At all stations in the system where dust may be created, dust is properly conveyed to a collector. Different types of traps and collectors are installed as necessary in the individual systems.

Throughout the process all movement is completely automatic. Small fans blow the compound throughout the entire system at low speeds, well below the velocity which might pulverize or break up the compound. There are no suction fans, screw conveyors, vibrating springs or other machinery used which might reduce the compound to smaller size.

Inasmuch as the system is fully closed, no dust can filter into the air and possibly harm equipment, as might be the case in ordinary

handling by shovel or open-type conveyors.

A further point of interest and value is that such installations can often be partially made through use of equipment already existing within the plant.

The systems are proving equally applicable to steel mills and continuous heat-treating plants. One is now going into the American Rolling Mill Co. at Middletown, Ohio, and various Detroit heat-treating plants are using the same type of system successfully.

Detecting Cracks with Black Light

THE detection of flaws or cracks in ferrous and non-ferrous materials has always presented a problem to manufacturers. Many methods of detection have been put forward, of which the most successful has been the magnetic one for use with ferrous materials, but no really satisfactory way has previously been devised for the examination of non-ferrous products, although many have been tried, *e.g.*, anodizing, and the oil and chalk or dye and chalk methods. All these methods have a common basis, in that they depend upon close visual inspection under a light which illuminates the article uniformly, including the crack or flaw in it. Such inspection demands skilled labor which has the dual disadvantages of being subject to a considerable amount of eye strain and the danger of passing faulty material as perfect.

A new method of crack and flaw examination, utilizing ultra-violet light and a fluorescent material, was recently inspected, according to *Sheet Metal Industries*, London. It may be explained that a non-fluorescent material illuminated with ultra-violet light will appear black or purple, depending upon the nature of the material; a crack or flaw in that material, if filled with a fluorescent substance, will glow with a characteristic color. In effect, the crack or flaw is filled with light while the remainder of the specimen remains dark.

The system has been developed by Colloidal Research Laboratories, Ltd., 66-70, Petty France, London, S.W.1, and makes use of a fluores-

cent solution which has already been successfully adapted to the

Magnaflux Corp., New York and Chicago, also has testing methods of this type, the patented names being Magnaglo and Zyglo.—Ed.

B.A.B. system of fluorescent lighting. Components to be examined are primarily passed through a bath of fluorescent material at a temperature of 158 deg. F. for an automatically controlled period. The specimens are then withdrawn and washed in a solution which removes all fluorescent material that has not become anchored to the edges of the flaws or cracks. Examination under a specially designed "black" lamp (a source of near-ultra-violet light) immediately shows up any flaws or cracks. The temperature of either bath is not critical, and the temperatures suggested are advanced as the best method for keeping the solvent in solution. The solution is supplied ready for immediate use; and also acts as a degreaser. Small components can easily be handled in baths of suitable size, and models are available utilizing conveyors for continuous processing to keep pace with the requirements of the production line. All operations can be made entirely automatic. The shape of the article governs to some extent the technique employed. For example, articles which can be loaded into trays and handled in batches can be suitably processed by dipping. Larger components, however, such as propeller blades, require a different technique, but in general the process can be adapted to deal with any articles and has been suc-

cessfully employed on specimens ranging from contact breaker screws to aircraft gasoline tanks.

The materials which are the core of the system are solvents which perform efficiently the primary function of maintaining the fluorescent material in solution and carrying it into the flaws or cracks of specimens. The fluorescent solution loss is approximately 0.23 gal. per 1000 sq. ft. of specimens, and the washing solution loss is approximately 0.17 gal. per sq. ft. Bath contamination does not occur in either case and all losses are mechanical.

Surface scratches which only have a depth equal to or less than their width are not revealed. Work is, however, proceeding upon a formula for evaluating cracks giving the ratio of width to depth, from which it would appear that inspection of finished components for cracks or flaws may become very closely controlled. The ideal system would seem to be that components could normally be passed either perfect or definitely bad, and the percentage of borderline cases made the subject of such an examination as has been outlined.

The particular advantages may therefore be summed up as follows: (1) The method may be used with equal efficiency with ferrous or non-ferrous materials; (2) detection is positive without eye-strain; (3) the specimens are degreased, thus telescoping two operations; (4) unskilled labor can be employed; (5) specimens are not stained, and (6) no additional treatment is necessary, as, for example, demagnetizing or cleaning.

Worn High Speed Steel Tools

WHEN your high speed steel cutters are "worn out," don't scrap them. They are still good—on the same job—usually for several times the original life of the tool.

The simple way to reclaim these tools is to braze tips of carbide to the cutting surface of the tool, letting the tip project slightly beyond the edge of the tool and then grinding the tool to size. Now when the tools wear undersize—they will probably take a lot longer to do this than did the original tools—they can be brought back to size by moving the tips out slightly.

This procedure of tipping high speed steel tools may be followed, as a matter of fact, not only for the purpose of reclaiming such tools when they are worn out but actually before the tools are completely undersize. Even new tools in stock may be tipped when it is desirable to convert operations immediately to carbides for increased production.

The process has the definite ad-

vantage of tremendously greater tool economy. It usually costs less to tip a tool with carbide than to buy a new steel tool and the tipped tool lasts longer. Furthermore, the practice conserves strategic tungsten since an ounce of tungsten in a carbide tip will do the work in many cases of several pounds of tungsten in other forms of cutting tools.

Grinding the H.S.S. Tool

Procedure in reclaiming a multiple point tool is first to grind back the faces to which the tips are to be brazed. The depth to which these faces are to be ground depends on the thickness of the tip to be used. During brazing, the tips should be placed so that they line up, of course. It is not necessary to grind a recess for the tip. The latter may be brazed to a flat surface, since tool loads are rarely so great as to demand a support around the tip. Often, milling a longitudinal groove is sufficient, if the H. S. S. tool is first annealed.

Prime difference between tipping an ordinary steel shank and a high speed steel shank with carbide is that greater care has to be taken to prevent oxidation. When you heat high speed steel, there is a tendency for the chrome contained in the steel to be sweated out. If the chrome is allowed to oxidize, it forms a coating to which it is difficult to make a braze adhere, since standard brazing compounds will not "wet" chrome oxide properly.

To overcome this is not difficult, however. The main things to observe are that the shank shall be heated quickly and no more than necessary and that plenty of flux be used to keep the chrome from oxidizing. It also helps to move the tip with a rod if possible when the shank is heated to help "wet" the steel surface with the Easy-Flu No. 3.

Brazing

When the tip is brazed to the shank, it is allowed to stick out slightly over the edge of the steel.

FIG. 1—A high speed steel core drill which has worn undersize can be salvaged by milling recesses in the faces and brazing in standard cemented carbide tips. The tips are then ground to original tool dimensions. The same process can be used before the tool is worn below size if it is desired to increase cutting speed or reduce consumption of tools.

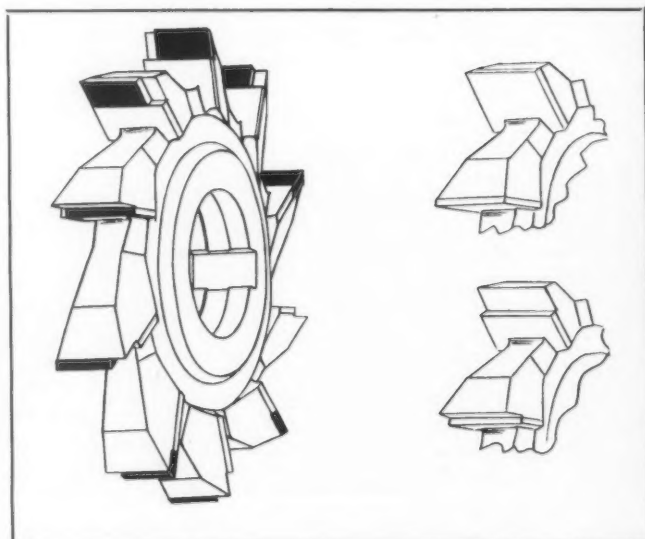
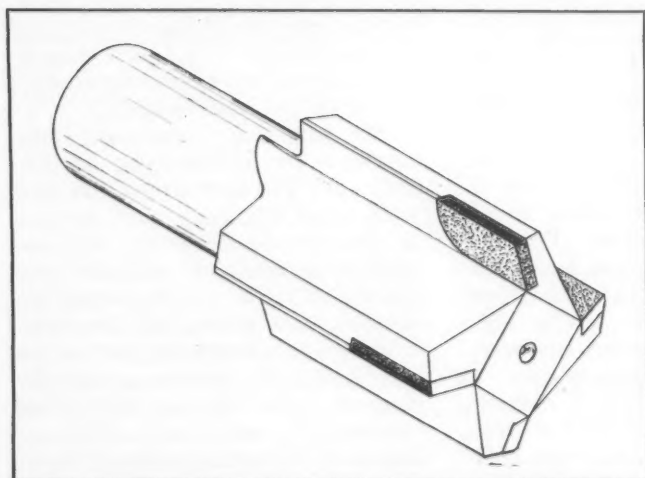


FIG. 2—Reclaiming a double face mill. Teeth of the high speed cutter are ground down, and carbide tips are brazed to the faces. Note that tips are staggered so that every other tooth cuts on one side, and intermediate teeth on the other. Detail views show the cutter teeth before grinding and after grinding before brazing the tip in place. After brazing, the tips are ground to original cutter specifications, taking care that rake and clearance angles follow recommended carbide tool practice.

Tipped with Carbide

By J. S. GILLESPIE
Engineer, Carboloy Co., Inc.

After all the tips are brazed in place, the complete tool is re-ground down to the proper diameter or size.

When the tool wears down in service, to bring it back to size it is necessary merely to apply heat to the tool, loosening the braze, move the tips out slightly, and allow the braze to set again. The tool is now re-ground to proper size. This procedure can usually be repeated several times during the life of the average tip, and tips can be replaced with new tips when necessary. In this way the original life of the tool is multiplied many times.

While the preferable method of

brazing tips to steel shanks is to heat the shank rather than the tip, it is necessary sometimes to heat through the tip to keep previously brazed closely adjacent tips from coming loose. When this is done, care should be taken to heat the entire tip evenly to prevent cracking due to uneven expansion of the carbide.

With short tips a conventional braze is entirely satisfactory. Where tips are relatively long, however, it is usually better to employ a sandwich braze in which a sheet of constantan (45 per cent nickel,

55 per cent copper) is placed between layers of Easy-Flo No. 3. This helps relieve brazing strains due to possible uneven cooling and the difference in expansion and contraction between steel and tungsten carbide.

In heating either through the shank or the tip, it is desirable to use a torch small enough to concentrate the heat where needed and large enough to provide effective heating of the entire areas desired. The tip, Easy-Flo No. 3, and flux of course should be in place before heating is begun, to avoid oxidizing.

Cupola-Melted High Duty Cast Irons

DEVELOPMENT of a cupola practice for the production of high-duty iron is described by W. W. Braidwood in the *British Foundry Trade Journal*. The normal practice at the foundry in question had been to use chill-cast, 3 per cent-silicon pig iron and steel scrap. This procedure was modified so as to eliminate the high-carbon, graphite-bearing constituents of the charge and ultimately of employing all-steel charges, supplying the necessary silicon and manganese by ferroalloys rather than by special pig irons. Cupola charges of this type were expected to yield iron containing 2.5 to 3.0 per cent of carbon and would permit the use, for castings of normal section, of silicon contents in excess of 2 per cent, and would render variation in silicon content above 2 per cent less able acutely to influence the structure and properties of the irons produced.

The initial experimental melts gave encouraging results, tensile strengths of 44,800 lb. per sq. in. being obtained on the 1.2-in. diameter bar. The physical condition of the scrap steel in the cupola charge was a most important factor, the ideal type being moderately heavy in section and of hollow form. In the actual production of high strength castings it was found best to maintain a coke bed height of 36 in. above the tuyeres. The steel scrap melts in the cupola at a level much nearer the zone of maximum tem-

perature than does the iron and, as it does not take up carbon until melted, the carbon is derived wholly from a shallow layer of burning coke. To insure an adequate depth of this vital coke layer, two methods were tried out: (1) The employment of really generous coke charges; and (2) the provision of extra coke in the form of separating or "sandwich" charges, as required. The second method was completely successful. For making the additions of alloying elements, briquettes bonded with cement were tried, as it was claimed that the oxidation of the alloying material is minimized by the protective action of the binder, but it was found better to charge unprotected ferroalloys. Lump ferrosilicon is a more efficient alloying medium than briquetted ferrosilicon, or 15 per cent silicon pig iron, or lump calcium silicide. It was feared that the inclusion of returned high strength iron scrap in the cupola charge would be accompanied by deterioration in the physical properties of the resultant cast iron, but the increase in carbon in the iron produced was much less than expected and the quality was satisfactorily maintained even when using up to 50 per cent of returned scrap in the total charge.

Micrographs of specimens revealed that the size and arrangement of the graphite varied widely from extremely fine interlacing deposits distributed in a network around the grain boundaries, to

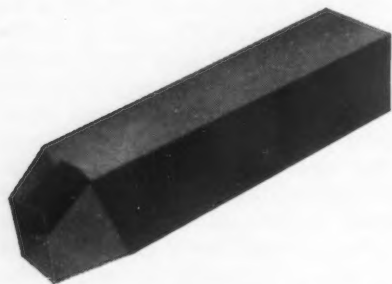
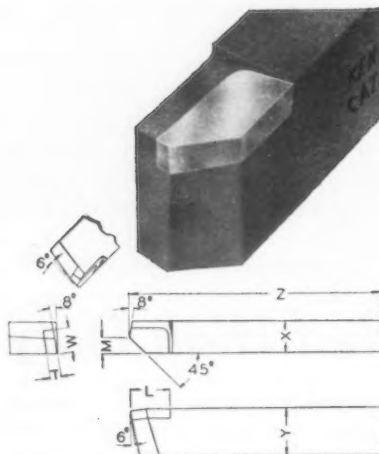
relatively coarse flakes presenting no definite patterns whatsoever. This wide variation appeared to exert no dominating influence on the tensile strength, but it markedly affected the resistance to impact. The impact strength was inversely proportional to the regularity of the graphite pattern. In some specimens, the graphite was present entirely in the form of very small flakes outlining the boundaries of what were originally the crystals of austenite formed in the earlier stages of the process of solidification; of the many names given to this form, the author prefers the term "reticular graphite." This form of graphite is always associated with lowered resistance to impact. Results of American research on the mechanism of the formation of graphite in gray irons are quoted. Tables and diagrams are presented giving details of the charging practice and the effects of ladle additions of carbon and ferrosilicon. For inoculation with carbon, discarded electrodes in lump, granulated and crushed form were available and ladle additions in any of these forms were entirely successful, lump form being probably the most suitable. The increase in carbon content was very small, but that in the structure was striking. A substantial increase in the impact resistance was obtained, and the new procedure described has proved to be completely satisfactory for the production of high-duty iron castings.

New Equipment . . .

Small Tools and Gages

Many new small tools, gages, tool accessories and other useful items around a shop or plant are described in this week's section on new equipment.

CARBOLOY CO., INC., Detroit, has established standardized designs of shear type tools to facilitate the machining of steel parts in which cuts are of the interrupted type. These tools are characterized by a negative back rake of 40 deg. When the tool is used for interrupted cuts, the impact load on the tool does not come at the end of the tip but farther back. Also, the entry of the cutting edge of the tool into the cut after each interruption is gradual, starting at the point of contact and working forward to the tip of the tool. The line includes four basic sizes of tools in both left



and right hand varieties, for a total of eight types. Shank sizes include 1 x 1 in., 1 1/4 x 1 1/4, 1 1/2 x 1 1/2 and 1 1/2 x 2 in. Blanks for the new standard shear type tools are of special design. All relief angles are finish ground. The rear corner of the tip projects slightly above the top of the shank to permit use of a tip thick enough to provide maximum resharpenings, while insuring adequate support thickness of shank steel below the tip of the tool.

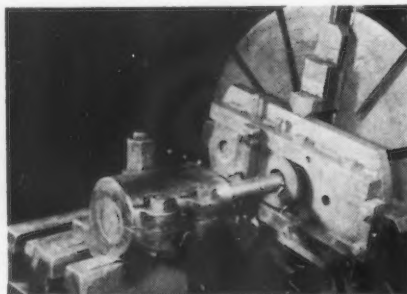
Carbide Tools With Lead Angle

IN answer to the demand for a steel-cutting carbide tool having a lead angle, the McKenna Metals Co., 144 Lloyd Avenue, Latrobe, Pa., announces new styles 39 and 40 Kennametal tools, which combine the lead angle or side cutting edge angle with a tip longer than customary on carbide tools having a lead angle. Style 39 is pictured. Style 40 is of the opposite hand.

These tools are being widely used in shell turning where uniform forgings permit the depth of cut never to exceed the length of the tip having a lead angle. Only the edge on the lead angle is sharpened and it is easy to maintain the control position of the nose as the tool is reground. The chip breaker is ground only on the section parallel to this lead angle. These tools, which are available in sizes of 1/8 x 5/16 x 5/8 in. to 3/8 x 3/4 x 1 1/2 in., may also be used for chamfering operations.

Hard Tool Bits

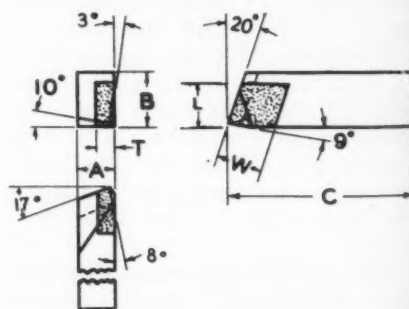
A NEW line of tool bits for machining hard, tough steels and copper or aluminum alloys has been announced by Black Drill Co., Cleveland. These tool bits are made of "Hardsteel," a new metal which has great shock-resistance and high heat-resistance. They are especially suited to work on heavy forgings



where deep rough cuts can be made at faster cutting speeds. Since they are solid Hardsteel, they can be reground on an ordinary wheel. But because they take abuse and operate efficiently at red heat, they need less frequent regrinding. Cases on record show that cuts per grind increased as much as 400 to 500 per cent when these tool bits replaced high speed steel tools. These bits are made square and round from 1/8 in. up in all the usual sizes.

Standardized Carbide Tools

IN order to eliminate a vast amount of special tool designing on the part of carbide tool users, as well as to speed deliveries of many formerly "special" tools, Carboly Co., Inc., Detroit, has announced a series of extensive "design standards." They enable elimination of the time interval normally required to prepare design drawings, figure quotations, prepare working drawings, and hand form special samples. While not carried in stock at present, these tools have been catalogued and



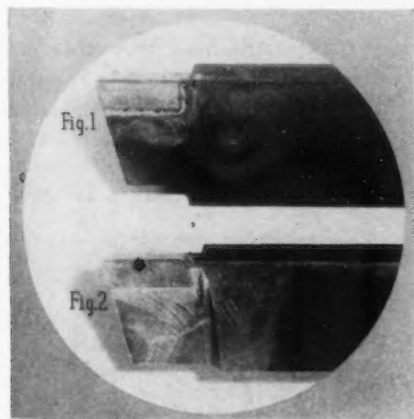
priced, permitting ordering without requiring quotations. Among the varieties of carbide tools and blanks for which design standards have not been established by Carboly are: cut-off tools, roller turner tools, grooving tools, shear-type tools; twist drill tips; plug gage and ring gage bushings; drill jig bushings; guide rings; twist drill stock; round, oval and half-round rod, rectangular rod and tubing.

Standard design cut-off tools range from $\frac{5}{8} \times 1\frac{1}{4}$ in. to 1×2 in. shank dimensions, in five sizes. Blank widths range from $\frac{3}{8}$ to $\frac{1}{2}$ in. Roller turner tools, or "box" tools, have been standardized for use on both Warner & Swasey and Gisholt turret lathes. Designed with unusually large tips for maximum life and greatly lower tool cost per piece, these tools are available in five design standards for W & S and two sizes for Gisholt lathes.

Three classes of standard design grooving tools are now available from Carboloy, these classes differing only as to tolerances on tool width. The size range is from 0.060 to 0.330 in. Carboloy tips for twist drills have been standardized in some 30 different sizes, ranging from $\frac{1}{8}$ to $1\frac{5}{8}$ in. diameter.

Brazed Cutting Tips

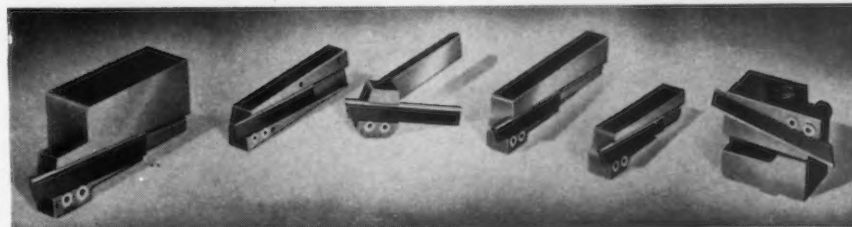
KREMBS & CO., 669 W. Ohio Street, Chicago, has developed a new process of joining cutting tips to tools. The process comprises a specially developed Fluxined-Spelter which is used to brush onto the contacting surfaces of both the cutting tip and the tool shank. The



work is then assembled to form a tight fit and brazed. When completed, the finished braze looks like a gold-plated joint with no waste of joining material and the cleaning job is almost nil.

Tool Holders

EMPIRE TOOL CO., Detroit, announces the introduction of six new tool holders designed for the accommodation of the Luers patented cutting-off blades on six additional types of screw machines. The development of these holders broadens the use of Luers blades to include their adaptability on the

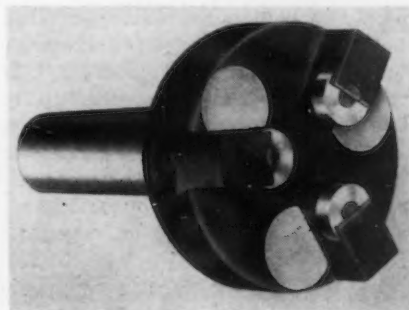


following makes of machines: Greenlee four and six-spindle automatics, New Britain automatics, all lathe and hand screw machines with round posts, Acme-Gridley R and RA series, and Gridley models F and G multiple spindle automatics. The blade is held in place by means of two cams which force the top surface of the blade against the ground surface of the holder and provide a solid bearing. The locking device can be made to release the blade quickly and simply. An arrangement on the locking wrench serves as a blade-setting gage and provides an efficient means for accurately resetting the blade after sharpening.

Burnishing Tool for Automatics

WHERE a surface smoother than the usual machined surface is required on screw machine parts, the model C burnishing tool is being offered by **Boyar-Schultz Corp.**, 2110 Walnut Street, Chicago, for use on small single spindle automatics. The three roller blocks slide in dovetail grooves in the tool body and are locked by large screw heads bearing on one side (white circles in the photograph). There are separate lock screws for the roller pins and each block can be adjusted radially by screws. Cemented carbide rollers and pins may be obtained on request. These turret tools come in three sizes: No. 00 C, $\frac{1}{16}$ to $\frac{3}{8}$ in. diameter by $1\frac{5}{32}$ in. length capacity; No. 0 C, $\frac{3}{32}$ to $\frac{19}{32}$ in. diameter by $1\frac{19}{32}$ in. length, and No. 3 C, $\frac{1}{8}$ to $\frac{15}{16}$ in. diameter by $2\frac{15}{16}$ in. length.

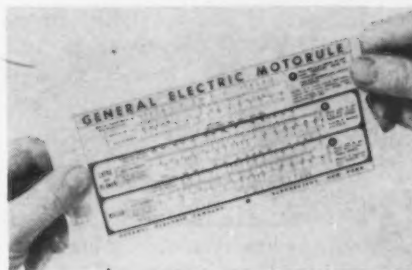
Boyar-Schultz has also introduced a box turning tool to take



heavy cuts with sustained accuracy on turret type automatics. It has a swiveling tool bit with set screw on the base for fine adjustments. There are two separately adjusted rollers. Rigid construction and generous space for chips and coolant are featured.

Tool Load Calculator

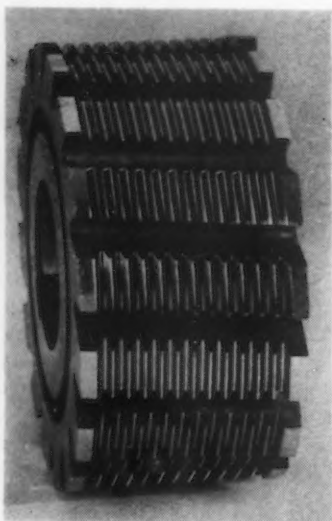
A NEWLY developed load calculator called the **Motorule**, which simplifies computing motor horsepower required for metal cutting operations on various machine tools, is being offered free by the **General Electric Co.**, Schenectady, N. Y. This calculator is expected



to be of assistance in checking motor capacity of new machines and also to aid in the selection of motors for machines formerly driven from line shafting. Designed along the lines of slide rule and applicable to a wide range of materials, the Motorule is accurate for a wide variety of cutting operations on lathes, drills, planers, and milling machines. To operate the rule, the user first refers to a convenient table of constants printed on the back of the rule. Then by setting the scales to the known cutting speed, feed, and cut, the user arrives at the cutting power required.

Thread Milling Cutter

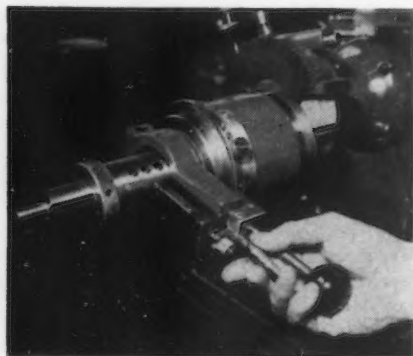
BUTTRESS-THREAD milling cutters which relieve the ends of the threaded portion automatically by removing the feather edge at the end of the thread as they mill the threads are now in regular production at **Detroit Tap & Tool Co.**, Detroit. The cutters are available in three basic styles: to relieve one end of the thread only, to re-



lieve both ends, or without plain cutting portions (no thread relief). The illustration shows a style of cutter designed to remove the feather edge at both ends of the thread. The cutters can be supplied in any style to suit standard thread milling machines and in both spiral or straight gash types. The cutters are available in both shell and shank types. The threads as well as the plain cutting portions are ground from the solid.

Tap Reconditioner

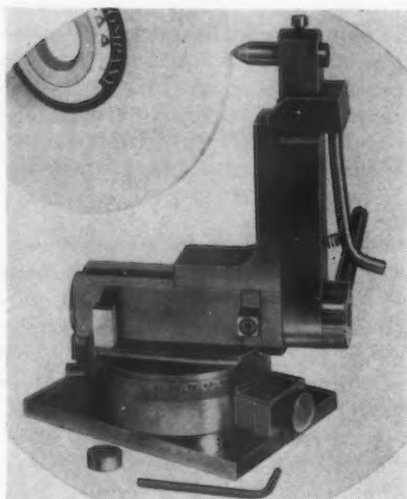
AN increase in the capacity of its tap reconditioner has been announced by *Detroit Tap & Tool Co.*, 8432 Butler St., Detroit. The machine can now handle all sizes and types of taps up to 1 1/4 in. diameter, including long shank taper taps. The latter has been made possible



by providing a "through" hole in the tap chamfering head. The spiral pointing unit has also been improved to increase ease of handling. Simple reconditioning operations reduce tapping costs by enabling greater output per tap during its useful life.

Form Wheel Dresser

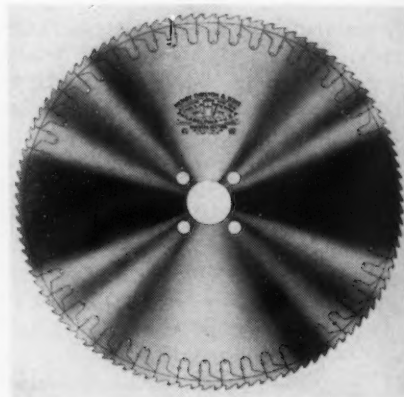
SOME unusual features are to be found in the radii and angle diamond wheel for universal surface and cylindrical grinders made by the *J. & S. Tool Co.*, 477 Main Street, East Orange, N. J. Angle dressing on either side of the wheel is done swinging the upright arm, on which the diamond tool is mounted, about a horizontal shaft incorporated in the swivel base. This shaft is mounted in preloaded ball bearings so as to eliminate all chatter and give a clean cut. The error introduced by the arc described by the dresser point is negligible. The upper part of the base unit slides in dovetail guides and the position of the diamond with



relation to the vertical axis of rotation for radii generation is gaged by putting an outside micrometer over a fixed and a movable pin. Both convex and concave (1/16 in. min.) radii can be formed. Stop pins on the base facilitate duplication of angles. Wheel size is limited to 8 1/2 in.

Inserted Section Saw

HENRY DISSTON & SONS, INC., Philadelphia, announce their new inserted section saw, a continuous rim saw with inserted sections rather than inserted teeth. This saw provides a maximum number of teeth for any given diameter and cuts extremely smoothly. It can be operated at speeds up to 5000 ft. per min. The design of the inserts is such that the cutting load is transmitted from each insert directly to the blade approximately at right angles to the resultant force. The full thickness of the blade extends to the extreme di-



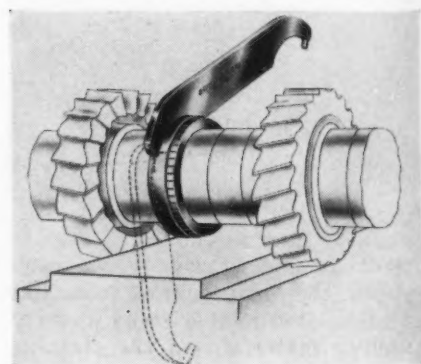
ameter. The inserts are quickly and easily replaced should they be damaged by an accident.

Lay-Out Dye

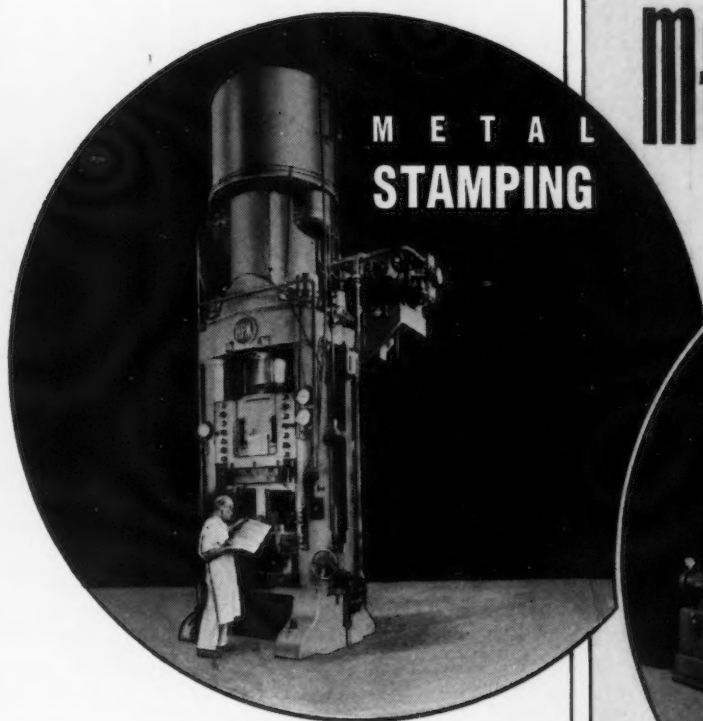
TO meet the demand for a quick-drying colored coating which could be applied on flat sheet metal so that work instructions may be scribed on it, the *Acme White Lead & Color Works*, Detroit, has announced a new product called Acme industrial finish lay-out dye. This new lay-out dye, semi-transparent and purple in color, dries in about a minute. The layout stands out bright and clear, because bright metal shows through the purple dye where scratch lines are made.

Collar Adjusting Wrenches

SPACING collar adjusting wrenches are now furnished as part of the equipment included with the 11 different sizes of micrometer adjustable spacing collars for mill-

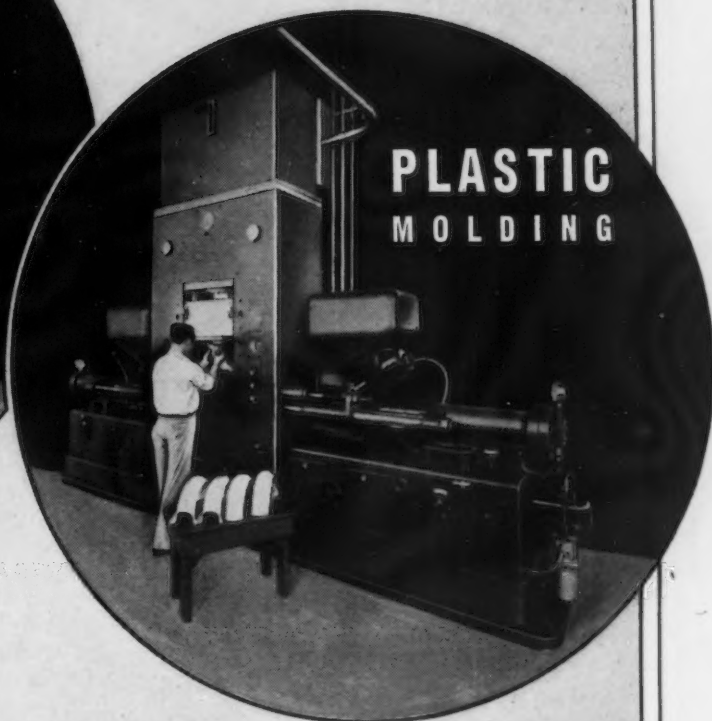


ing machine cutter arbors being manufactured by the *Dayton Rogers Mfg. Co.* of Minneapolis, Minn. These new double end pin spanner wrenches make it possible for the operator to adjust the spacing collar by merely loosening the cutter arbor nut and turning the collar to the desired width as engraved on the outer sleeve of the micrometer barrel.



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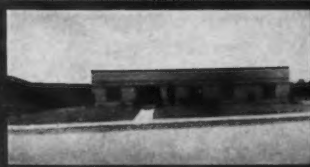
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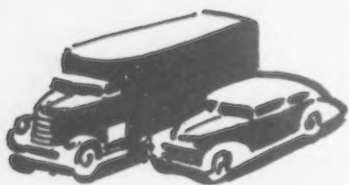
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Assembly Line . .

• Plane cargo carrier program shunted back: Nash-Kelvinator job cancelled while Navy advances warplane plans . . . Consolidated buys Stout firm . . . Tool program "over the hump".



DETROIT — Nash-Kelvinator, well along on plans to build flying boats on the Gulf Coast, was rudely jarred late last week with a cancellation of that contract by the government. This is a sensational development; it indicates that Washington may be revising its entire program on airborne cargo carriers, for Nash-Kelvinator was on the very threshold of production, anticipating that its first Vought-Sikorsky boat would be assembled not long after the first of the year. Cancellation of this contract makes it apparent that flying freighters do not rank as high on the product priority list as was indicated by the past few months' hue and cry over them.

At least they rank below patrol bombers, for the uncompleted Nash-Kelvinator plant being set up for the Vought-Sikorsky output will be turned over to an unnamed aircraft company to expand its present production on the patrol bombers. The Navy explained that the need for heavyweight air battlers for Pacific duty outweighed the current need for transoceanic cargo carriers, and that the Nash-Kelvinator plant, farthest along and readily convertible, was top nominee for enlarged warplane production.

Cutting off the cargo carrier

program at the point where it was farthest along may explain the cool reception given proposals by shipbuilders Henry Kaiser and Andrew Higgins when they sought to enter the field. In light of retrospect, it would seem that while Messrs. Kaiser and Higgins were seeking to obtain permission to build flying freighters, the trumpets of doom were already in readiness to play a requiem over the program, at least for the present.

Naturally, the loss of the plane job temporarily unbalances the Nash-Kelvinator war program to an important degree. But fortunately for that company, the Vought-Sikorsky job was no better than the third largest for the concern. Manufacture of Pratt & Whitney airplane engines and Hamilton Standard Hydromatic propellers both involve more volume than did the flying boat contract. The size of these jobs is to be increased.

CANCELLATION of the plane job brings to a dead end a large amount of jig and fixture work which was well under way in subassembly plants of the company. Many thousands of man-hours of work will apparently have to be counted as wasted, for it is an open question how much of this production tooling can be turned to other uses. Salvage of the machinery bought for the job, some of which has been delivered, is more likely. The final assembly plant itself, as has been mentioned, will be converted, and in all probability can be considerably if not completely modified for the new requirements.

Desire of the Navy to expand patrol bomber and combat output may mean an expansion ahead on the program of the Eastern Aircraft Division of General Motors Corp., which is now in production on two types of carrier-based planes originally designed by Grumman. Five former automotive plants are now at work on these jobs.

This sudden vis-à-vis in the Nash-Kelvinator project dramatizes the difficulties which producer companies have all had in

adapting themselves most efficiently to the war program. A top executive of one of the larger truck companies was discussing this situation very recently in a private conversation. He was talking about the cutback of truck ordering, which has developed in the last 90 days.

"We were holding facilities open for that truck work," he commented. "Had we known they would be only partially used, we could have converted the portion which we would not need and could have bitten into other jobs. Now the machines are idle, and so are some of our employees, and we have been trying—rather late—to get some new business from the government. It all takes time that we can hardly afford to waste."

At the same time, this executive made it clear that he did not blame the government, that the exigency was simply one which crops up again and again in wartime.

Following this chain of reasoning, it might seem reasonable to expect a decided advance in delivery orders for trucks, now that the North African campaign is utilizing huge quantities of land transport facilities, and increases for tanks as well.

But it appears from the state of things that these requirements were anticipated long since, when the battle plans were drawn. Great stores of truck assemblies, built up and lying at Detroit and other depot points, have been subtly vanishing in recent months; apparently they constituted the backlog necessary to undertake the Mediterranean venture. Similarly, there have been fairly good stocks of completed medium tanks at certain points, standing by, it would seem, for the same purpose.

CHANGES in war production are being accompanied these days by changes in corporate set-ups. It is understood that a deal has been arranged, to be announced soon, whereby Consolidated Aircraft Corp. will take over the Stout Skycraft Corp., Michigan firm headed by William B. Stout.

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ON THE ASSEMBLY LINE

Consolidated, mainly known as a builder of large aircraft, has developed interest in the small plane field which Mr. Stout has been exploring in recent years. Consummation of the arrangements would point to a widened activity by Consolidated in the spheres which have been quietly, virtually secretly, developed at the Stout laboratories.

The place which Mr. Stout may have in the new arrangement will likely not be known until Consolidated announces the move. It is believed that the Fisher interests, which have been present in the

grams are starting to thin and, although there are quite naturally new programs coming along, they are not in the tremendous bulk of several months ago.

SOME facilities are opening up, and there are reported layoffs of tool designers in smaller shops, which have been identified mainly with one or two individual projects. These shops have been living on overflow business from the larger and more established places and when their current programs finish up, as they are finishing,

ments as soon as the prospect of steady work begins to outweigh the diminishing advantages of higher pay scales.

THE gradual catching up of the tool program and the spotty layoffs of the tool designers have welcome implications in the war production program. The trend means that the design job, by and large, has approached the completion stage, that the tooling job is moving into the mass production phase. Armament manufacture has moved a good step forward.

One effect of this expanded tool and die program of the past several months, outside of its production ramifications, has been the great increase in the number of skilled men, or at least men who can pass today in that classification. Upgrading has brought scores of newcomers into skilled categories, more than making up the void which was started when apprentice training was discontinued in the early thirties. Pontiac Motor Division, for example, is supplying its tool repair shops with men upgraded from production ranks.

This successful upgrading program began last February when 75 men who had applied for such work were chosen for training. All were producing tool making details on machines within three to five weeks and some have progressed from machine to bench work. The average length of time to train a machine man is said to be about four months.

Upgraders now make up the entire afternoon and night shifts of the Oerlikon gun plant tool grinding department, exclusive of supervision, and about 80 per cent of the day shift. They constitute about 45 per cent of the entire tool room force in the Oerlikon plant, beginning with straight turning with lathes and flat grinding on surface grinders where dimensions are not too close and rapidly stepping up to finer work.

Oerlikon has also set up a department of its own to service plug gages. This department is run 100 per cent by upgraders as far as machine work is concerned, and is repairing all of its Oerlikon plug gages as well as those from the torpedo plants, an average of 25 per day.



POLICY PIPELINE: Pictured at this Packard dinner for 500 factory supervisors, foremen and UAW-CIO shop stewards, are John K. McDaniel of the executive council of Packard Local 190, UAW; C. E. Weiss, company industrial relations manager, Prof. Arthur Secord of the University of Michigan, and George T. Christopher, Packard's president and general manager. Information on company policy was given at the meeting, to be transmitted to other Packard employees.

Stout corporate picture, are withdrawing from participation, rather than continuing their interest in any arrangement which may be set up as a result of an absorption.

Of more general interest are indications that the broad war production program appears to be past the topmost height of the tooling stage, at least as far as the Detroit area is concerned. Tooling capacity in the smaller shops and in some of the larger shops is beginning to open up a little and there are scattered reports of layoffs of tool designers.

It appears entirely logical that the peak in machine and tool production should have been passed by now. Last summer when the phase of conversion to war work was at its height, every program had to go forward with the greatest rapidity. All tooling facilities were strained to their utmost and expansion was at a frenzied pace. Now the great overall tooling pro-

the lack of "good connections" makes it difficult for them to find replacement work. As a matter of fact, one very large producer which ordinarily employed eight outside tool shops for its business and had to swell this number to approximately 100 during the past year is now beginning to reduce, aiming back toward concentrating its outside work once more.

As the result of this general development, some sources in Detroit are anticipating considerable mortality in tool and die shops in the period ahead. In the first place, they will not have the work they had during 1942. In the second place, as their operations become more sporadic they will be unable to hold their men, most of whom they attracted by virtue of higher wage scales than were paid in the more stabilized shops. Men who profited by the pirating of the alley shops can be expected to return to the larger establish-

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In your tool room, machine shop and throughout the plant there are worn or obsolete dies, tools, jigs and fixtures that *should* be helping to make more fighting equipment for our soldiers. Dig them out. They are the *start* of more war weapons. Then separate your tool

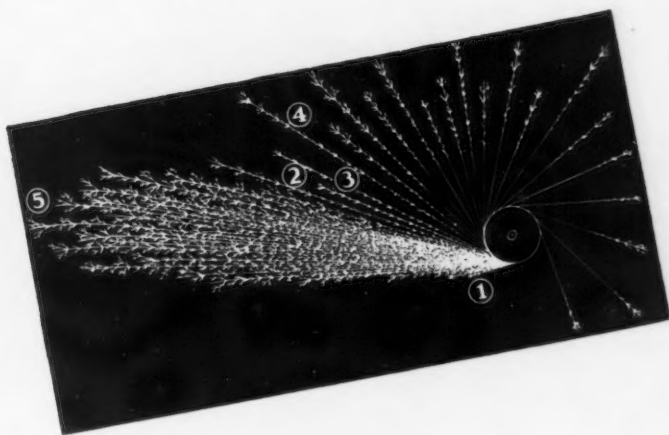
steel scrap. It is worth more to you, and to your country, when it is properly sorted.

To help you separate your tool steel scrap for salvage, our Testing Department has developed the *Spark Testing Guide* offered below. This 21" x 30" wall chart will be helpful to your men in learning more about *Spark Testing* to quickly classify tool steel scrap.

SPARK TEST FOR No. 11 SPECIAL

Straight Carbon Tool Steel

This spark is one of the most spectacular to observe. The stream is full and brilliant. It is characterized by a dense stream (1) adjacent to the wheel. Carrier lines (2) are relatively long, continuous, brilliant, almost white. Stream is composed of sprigs (3), preliminary bursts (4) and main bursts (5)—none of them suppressed. There is a tendency for the spark to be carried around the periphery of the wheel.



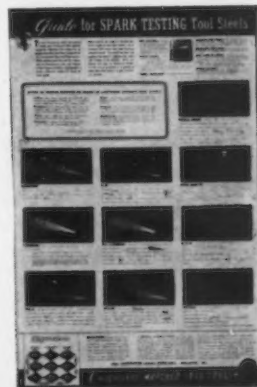
USE SPARK TESTING

- to separate miscellaneous tool steel scrap, your broken tools, worn dies, etc.
- to classify tool steel that has lost its identity in stock.

IN TOOL ROOMS, many hours and precious pounds of metal are saved when tools are always made from the right tool steels. Let your tool makers use the Carpenter *Spark Testing Guide* to help them classify tool steel that has lost its identity.

THE CARPENTER STEEL COMPANY
121 Bern St., Reading, Pa.

A note on your company letterhead will bring you this new wall chart. From it your men can learn the spark patterns caused by the major elements in tool steel. Instructions are also given for Spark Testing procedure; wheel speeds, effects of wheel grain size, dressing the wheel and pressure required. Write today for your Guide for Spark Testing Tool Steels.



Carpenter

MATCHED TOOL STEELS

Washington . . .

• McNutt's move to take over Selective Service may meet Army-Navy stone wall . . . Deferments of WPB dollar-a-year men cancelled by FDR . . . Railroads may get more steel than expected.



WASHINGTON — While the tides of an allied victory run higher to the great joy of the nation, in Washington there is an ebb and flow in the steel situation and in other matters more or less affecting it. Though attention is naturally focused on the war, considerable interest has been directed to events in the Capital. Here are some of the waves which drew the spotlight.

WPB Would Lift the Bars

Agents in New York for a Brazilian steel company have run into an inexplicable desire on the part of the WPB Material Redistribution Division to requisition at scrap prices about 200 tons of reinforcing concrete bars. The bars have been in inventory for about six months and the Redistribution people think that is too long.

McNutt in a Squeeze

The career of Paul McNutt, War Manpower Chief, which has been threatened by Congressional criticism, spearheaded by Senator Byrd, Democrat of Virginia, may be shortened if the Army and Navy get mad enough about the McNutt move to take in Selective Service. The experience of other agencies which have crossed swords with the armed services should serve as warning and particularly since there have been rumblings of protest from the War Department. It could happen that the process will

be reversed. Pincers movements work that way.

The effect on industry of military control of manpower may be anticipated to be beneficial. Labor unions would not be too happy because it is indicated that the Army would not allow manpower hoarding in plants which are not running at capacity. The proposed technical boards to pass on the draft of skilled employees would be given administrative strength and employers could expect proper consideration of requests for deferment of necessary men.

President Puts Heat on Heel Cooling

At the President's press and radio conference last week at which he said that deferments which had been given to government employees should be cancelled, he indicated that WPB dollar-a-year men should not be considered exceptions. The President declared that there would not be any discrimination in favor of brains but there will be in favor of technical training. Widespread approval met this order.

More Steel for Railroads?

Transportation needs are being recognized at WPB, where steelmen think that the railroads are likely to get more nearly what they have asked for than had been expected. This despite relatively low

1943 allotments made so far. Easing in steel supply is the basis for this view. There is, however, a difference of opinion within the industry itself.

The Association of American Railroads has laid before WPB a program for the 1943 construction of 80,000 additional freight cars and 900 locomotives. This program is based on an estimate that there will be an increase in railroad freight traffic in 1943 of 15 per cent in ton miles over 1942. According to railroad calculations, active cars will increase with a rise in ton miles in a ratio of one to three.

The breakdown of 1943 car requirements covers 3500 box, 10,000 flat, 2000 covered hopper, 25,000 hopper, 35,000 gondola and 4500 ore cars. It is estimated that these cars will require 1,600,000 and the locomotives about 225,000 tons of steel. High ranking railroad executives place minimum requirements of the railroads for 1943 at 1000 locomotives, 100,000 freight cars, and 2,000,000 tons of rails.

Planners Would Take Over

What the railroads will be able to get in the way of new equipment is arousing deep concern for two particular reasons: (1) the keen public desire that the carriers shall be able to continue the out-

"IT'S LIKE THIS": Brigadier General G. M. Barnes, chief of the technical division of the Army's Ordnance Department, explains points of a tank model to Dr. E. C. Bain, U. S. Steel Corp.; Dr. F. B. Jewett, American Telephone and Telegraph; Dr. W. D. Coolidge, General Electric Co.; R. Furrer, A. O. Smith Corp.; Dr. F. Sparre, E. I. duPont de Nemours; C. L. Bausch, Bausch & Lomb Optical Co., and Fred M. Zeder, Chrysler Corp., at the second of a series of conferences for studying methods of improving materiel.

International News Photos



OVERHEAD HANDLING

Solves Your **MANPOWER** *Problem!*

UNLOADS 21 TONS
IN 30 MINUTES

SPECIAL CRANE SAVED
\$600 PER YEAR

HANDLING COSTS
CUT 64%

SAVED 32 MANHOURS
IN CUPOLA CHARGE
DELIVERY

2 MEN UNLOAD CAR
IN 1½ HOURS

ONE-MAN CONTROL
OF STOCK DELIVERY

STORAGE INCREASED
50%

PRODUCTION
INCREASED FROM 26
TO 48 TONS PER DAY

★ Long before the war, American MonoRail equipment was solving manpower problems. Today, the job has been multiplied many times but American MonoRail equipment is meeting it with significant regularity.

American MonoRail equipment enables one man to do the work of many. It reduces fatigue caused by lifting and carrying. It reduces accidents. It keeps production on scheduled routes without delays and results in savings in time and money.

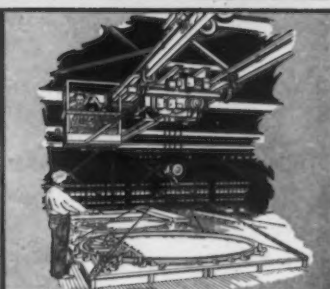
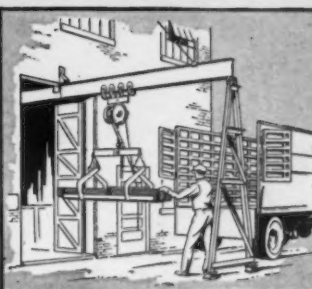
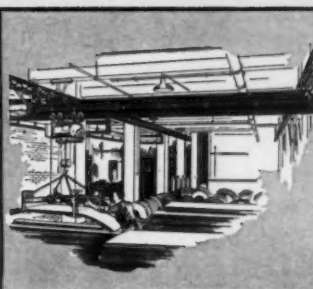
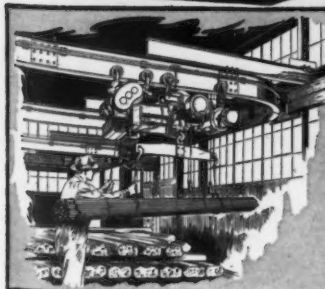
To achieve volume production at minimum costs with maximum speed, it will pay you to call in an American MonoRail Engineer. Let him show you how American MonoRail will solve your manpower problems and bring you increased production.

THE AMERICAN MONORAIL CO.

13103 ATHENS AVENUE



CLEVELAND, OHIO



standing job they have done, and (2) the anxiety to avoid government control, an anxiety whetted by the memories of the miserable showing of such government control during the first World War. This fear has been inspired by the recent report of the National Resources Planning Board. This report is, in the words of Railway Age, "based on the assumption that private ownership and management will be broken down during the war or post-war period; that a revolution in transportation should be made; that the government (with the taxpayers' money) will need to, and should take over direction and financing of all reorganization, rehabilitation and improvement of transportation." Obviously, this would mean government ownership, and this is openly advocated by social planners on the board. Significantly, Owen D. Young, chairman of General Electric Co., did not sign the report. On the contrary, he pointed out that the report is not necessarily endorsed by his committee—the Advisory Committee on Transportation of the Board.

Steel Expansion Progressing

While expansion in steel has been delayed with respect to some units, the overall program has moved for-

ward at a better rate than has been generally realized. This is shown clearly by a report on the proposed 10,000,000-ingot ton increase. The report gives the increase in blast furnace, open hearth and electric furnace capacity that had been completed at the end of October, and what it means in improving present supply. The report also deals with the amount of steel and labor used in expansion and gives estimates of time required for construction of additional capacity and the time of its completion.

Salvaged Scraps

The Federal Reformatory for Women at Alderson, W. Va., recently asked for a large supply of non-climbable wire. Contrary to what you may think, the idea was to keep the women in. P. S. The Government did the best it could. It sent 37 tons of barbed wire.

Along with other imported British ideas, WPB is taking up the habit of labeling otherwise innocent documents as "secret" and "confidential." However, our English cousins have gradations, such as "very confidential" and "most secret." The latest confidential label has been fixed on the processing instructions for PRP in the first

quarter of 1943. Proposed scheduling instructions under CMP are now marked "confidential." Employees are given implied warning of discharge if they divulge the contents of these papers.

* * *

Though there is a hush-hush regarding the construction of dormitories for government workers, a temporary structure using a minimum amount of steel is rising east of the famous cherry blossom-ringed Tidal Basin. The site is an erstwhile golf course.

* * *

At a recent press conference at WPB attended by Army, Navy, Maritime Commission and WPB officials, Leon Henderson in his role of Civilian Supply head was also present. Throughout the conference, Mr. Henderson coached Donald M. Nelson, WPB Chairman, on the latter's answers to newsmen. Mr. Nelson took the coaching, turning questions away which were not germane to the subject for which the conference was called and pitched some of his answers to agree with Mr. Henderson's advice.

* * *

Talk about Donald M. Nelson's projected trip to England to inspect war factories may become actuality sometime this month, many WPB officials think.

* * *

When the scrap stimulation campaign was at its peak, ideas for scrapping house keys and automobile bumpers competed for popularity with notions to collect bobby-pins, hairpins and old razor blades. But, suggestions for denuding public buildings of ornamental metal were not popular at all.

* * *

In the federal triangle whose apex houses the Federal Trade Commission and whose base is the Commerce Building, thousands of tons of metal are devoted to non-essential purposes.

Practically all new government buildings with offices of tennis court proportions are resplendent with expensive alloy steel. The decoration doesn't stop with doors and trim, but many buildings have washrooms which are entirely equipped with jewelry steel, not to mention shower baths and other luxuries which would excite the envy of Louis XIV, famed for his love of magnificence and munificence.

THE BULL OF THE WOODS

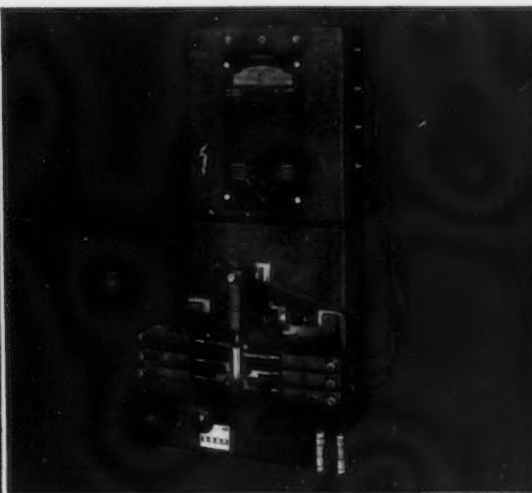
BY J. R. WILLIAMS



Increase SPEED AND ACCURACY WITH **SHEFFIELD** PRECISION GAGING INSTRUMENTS



The Visual Gage is available in six magnifications—500, 1000, 2000, 5000, 10000 and 20000 to— for checking production and reference gages, work in progress, receiving and final inspection, laboratory and research work. Pitch diameter checked by special attachment.



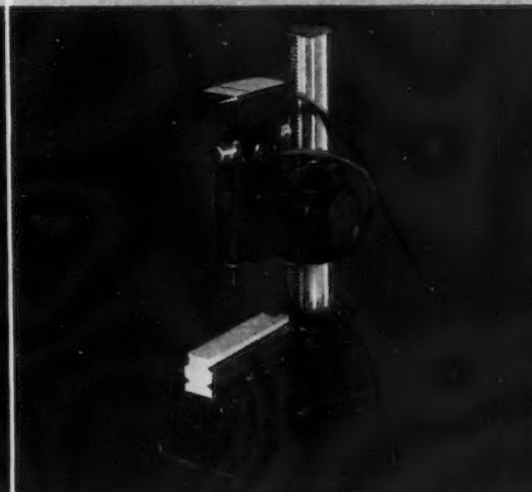
The Multichek is a combination gage which checks simultaneously a number of critical dimensions, indicating by light signals whether each dimension is within, above or below tolerance limits. A master signal integrates all individual signals for maximum checking speed.



The Precisionaire is an airflow gage for the checking of internal diameter, taper and out-of-round on long and/or small bores such as rifle barrels and other relatively inaccessible holes. The gage may be presented to the work, Model A, or the work brought to the gage, Model B.



The Internal gage checks hole diameter and out-of-round with the same precision as external dimensions are checked on the Visual Gage. It is very advantageous where selective assembly is concerned as in the case of the special piston application illustrated.



The Electrichek is used to show instantly by signal lights whether a dimension is within tolerance, undersize or oversize. It is used as an inspection gage. It can also be mounted on any special fixture desired or directly on a machine to check parts in process or for machine control.



The Thread Measuring Instrument is a combination electrical and mechanical device for checking the lead of screw threads or rack teeth. Precision gage blocks are used as a direct reference. A Super-Precision Micrometer facilitates an accurate set-up and the checking operation.

Descriptive literature available upon request

THE **SHEFFIELD**
CORPORATION
DAYTON, OHIO, U. S. A.



WEST COAST . . .

• Mine operators greet War Manpower Commission official with protests on its "weak-kneed" labor policy . . . Coast shipyards again set new launching records . . . Washington yard launches five boats simultaneously.



SAN FRANCISCO—Tears almost welled in the eyes of Brigadier-General Frank J. McSherry, director of operations of the War Manpower Commission, as he confidentially told over 500 mine operators attending a Metal Mines Conference at Salt Lake City last week how he had given up the command of an anti-aircraft brigade bound for European service—possibly for North Africa—in order to help solve America's manpower problems.

For all the actual assistance the Manpower Commission has been able to give the mine labor force, the miners were free to state in hotel room star chamber sessions that the General might just as well have had the pleasure of urging on the Algerian ack-acks. No one denied that labor is still the Number One metals production problem. Even the General was forced to admit, when regaled with tales of how quickly the mine labor freeze defrosted, that the Manpower Commission's manifesto to lumber and non-ferrous metal workers to stay on the job had no more teeth than the American eagle. And when someone asked what had become of the thousands of workers who were supposed, by terms of a commission order, to be sent from closed gold mines to copper and other essential mines, the unhappy militarist gave the actual figures: About 700 gold miners had registered for other employment; about 300 had gone to the essential mines.

General McSherry was content

merely to parry the many critics of the weak-kneed manpower body with the self-evident assertion that no labor force can be assured for any industry, essential or not, until some type of National Service legislation is enacted. But when Nevada's Senator, Pat McCarran, jacked himself up from the audience to bellow that a preponderance of the 4200 miners recently furloughed from the Army to bolster copper, molybdenum, zinc and tungsten ore production were experienced only in the coal mines of the East, the General swung his artillery to counter-attack—and found he had allies. No sooner had the manpower marshal roared his belief that coal miners were better than totally inexperienced mine labor or no labor at all than C. R. Kuzell of Phelps-Dodge routed the bellicose senator.

"The Army sent us 750 of those coal miners," he declared. "I wish they'd send 750 more if nobody else wants 'em."

Lieut. Col. H. Arnold Rich, director of Utah's selective service, tossed out a hint as to how labor might be secured for the nation's essential industries even if Congress fails to pass a National Service Act. He pointed out that selective service boards might be instructed to withdraw all dependency deferment for men who failed to accept suggested essential employment. Precedent existed, he declared, in the program through which doctors and dentists were induced to join the Army, and justification lies in the fact that America is the only warring nation in which dependency is grounds for deferment from military service.

THE nation's war industry employees now number about 18 million, compared to 6,500,000 at the end of 1941, according to General McSherry. By the end of 1943, 23 million persons will be actively supporting the home front, he estimated.

Both General McSherry and Colonel Rich warned the mine operators that occupational deferment, which has been granted on a blanket basis both to skilled and unskilled mine workers, and furlough of soldiers could be counted on only for temporary relief of labor shortages. More extensive use of women in those states whose

laws permit was urged. More important, the mines were told to inaugurate immediately an upgrading and training program, bootstraps heretofore largely ignored as a possible means of self-elevation from the labor morass.

Many man-hours have been made immediately available for ore production in Utah by temporary suspension of a state law providing that workers may not stay underground for more than 8 hr. at a stretch.

Alloy steel production will not be limited by the supply of ferro-alloys, and policies of the WPB ferro-alloys branch are being shaped with that situation in mind, Miles K. Smith, chairman of the branch, told the same meeting. Because of extreme good fortune in foreign shipments being received safely, more than sufficient manganese ore has been provided for the steel industry, and a small surplus is being stockpiled. Chrome, for which America is also heavily dependent upon foreign sources, is being received in satisfactory quantities. Therefore, Mr. Smith indicated, future projects for increasing domestic production beyond present levels will be strictly judged on the basis of quantities of critical materials required and with respect to possible future increases in demand.

TUNGSTEN and vanadium, always tight spots in the materials program, are still urgently needed in larger quantities. Demands for molybdenum continue to outdistance supply. It was noted as significant that ores included in the pre-war stockpile program are those in which present supplies are not the most critical. On the other hand, such metals as copper, for which advance provision was not made before the war, are causing headaches to the supply chiefs.

The relative status of the critical minerals, as judged by the Army, is indicated by the order of mines to which soldiers were sent in the recent furlough—copper, molybdenum, zinc and tungsten. Other minerals, such as mercury, in which the labor situation is seriously hampering production, have not been afforded relief by the release of men from the armed forces.

Domestic tin production, always



THE Magic Hand

THAT DOES HALF THE WORK

Probably it was an accident. Perhaps there was a vine tangled around a fallen tree . . . a half-savage human whose child-like mind contained the first faint glow of scientific curiosity . . . and the principle of the pulley became a new discovery. A magic hand, indeed—pulling as hard on the anchored end of the line as a man did on the other—to move the load with half as much effort.

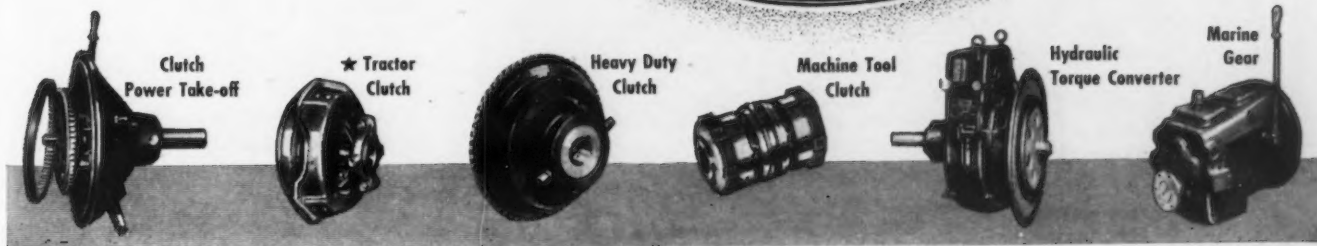
How many times has that simple principle enabled man to do the otherwise impossible! Today, we have multiplied the pulley into a block-and-tackle to help engines lift enormous weights. These engines need other help, too: *clutches* to permit them to get a running start on their loads, to permit interpolation of gears, to permit *control* of the engine's power.

The designing and building of industrial clutches for every purpose is—and has been, for 24 years—the specialized business of Twin Disc Clutch Company. Whether it be a small, rapid-action machine tool clutch, or a husky power take-off for an 800 HP monster, the Twin Disc Clutch Company builds it better (and usually cheaper) because the Twin Disc Clutch Company has concentrated its energies in this single field.

If you build a machine in which driving and driven units must be controllably connected, you will be wise to ask how Twin Disc engineers can help you. Immediate production is subject to war demands, but plans for tomorrow can be made today—and we are ready to help you make them. TWIN DISC CLUTCH COMPANY, 1402 Racine Street, Racine, Wisconsin.



Twin Disc Tractor Clutches withstand the punishment of hard service under trying conditions of load, heat and penetrating dust—another example of successful building for the job to be done.*



the butt of jibes by the sapient, acquired a status of respectability with the announcement by W. Earl Greenough of the WPB tin-lead division, that three tons of 30 per cent tin ore has actually been shipped from a Nevada property, that about 80 tons of 8 to 10 per cent ore was in sight, and that prospects were good for a further substantial tonnage of ore running about 2 per cent.

With 1942 production of strategic minerals reaching or within a stone's throw of goals set at the outbreak of war, 1943 ore requirements were outlined by Col. Clifford V. Morgan, Army-Navy Munitions Board representative, as follows: Antimony, 400,000 tons; tungsten, 30,000 tons; mercury, 1,400,000 tons; manganese, 1,400,000 tons; chromium 900,000 tons; molybdenum, 13,000,000 tons; vanadium, 4,000,000 to 5,000,000 tons; copper, 270,000,000 tons; zinc, 35,000,000 tons; and beryllium, 5000 tons.

No one at the meeting minimized the burden placed upon government planning agencies by constantly shifting requirements both for domestic consumers and Lend-Lease. For the future, uncertainty is particularly the key-note in quicksilver production. As stated by R. J. Lund, chief of the miscellaneous minerals division, uncertain reserves threaten the continuance of

large mercury production by the larger American mines. Although present domestic production, combined with imports from Canada, Mexico and Peru, is keeping pace with requirements, inability of mines to undertake normal development work because of labor shortage makes almost certain a drop in production during 1943 and a serious situation in 1944 unless exploration can be returned to its normal pace. The United States Bureau of Mines, the United States Geological Survey, and even the Metals Reserve Co. have been called in as consultants to the War Production Board to seek out new quicksilver deposits which may be worked when present sources are exhausted.

WITH launching records falling like shattered clay pigeons on all sides, coast shipyards are still far in the vanguard of merchant ship production. Here is how the representative coast contractors for the Maritime Commission stacked up during September on ship launchings: California Shipbuilding Corp., Los Angeles Harbor, 12 ships launched, averaging 38.4 days per ship; Oregon Shipbuilding Corp., Portland, 11 ships launched, averaging 31.1 days per ship; Richmond Shipyard No. 1, five ships launched, averaging 42.4 days per ship; Richmond Ship-

yard No. 2, seven ships launched, averaging 44.9 days per ship. During October, the launchings were as follows: California Shipbuilding Corp., 13 ships launched, averaging 34.3 days per ship; Oregon Shipbuilding Corp., 12 ships launched, averaging 28.8 days per ship; Richmond Shipyard No. 1, six ships launched, averaging 38.2 days per ship; and Richmond Shipyard No. 2, 10 ships launched, averaging 42.5 days per ship.

Despite these fine averages, the coast yards all are well on their way to another cut in November averages, placing them far in advance of the Eastern yards, with the possible exception of the Bethlehem Fairfield Yard.


Unique during the present war, launching of five ships simultaneously was made by Northwestern Shipbuilding Co., Bellingham, Wash. The vessels each had a cargo capacity of 120 tons, and will be used in Alaskan waters.

REORGANIZATION of the War Production Board iron and steel branch is accepted with cynicism on the West Coast. Although commitments have been made to add substantially to new furnace capacities in the Far West, the old Vanderbilt No. 2, formerly a producer at Holt, Ala., still lies knocked-down on a railroad siding. This blast furnace, which could be producing up to 450 tons per day on Pacific Coast ores, was originally destined for shipment to China prior to outbreak of the war. When shipment to the Orient became manifestly impossible, it was optioned to Harlan Bradt, who has made repeated requests to the War Production Board for authorization to put the furnace into operation using ore from the Eagle Mountains, southern California's richest deposit. WPB and its predecessors have turned a deaf ear to Bradt's proposals, although they were originally made long before Henry J. Kaiser sold top authorities on his Fontana works. Bradt still has a proposal before the War Production Board to place the old furnace into operation with Eagle Mountain ores, and as yet has not received an official WPB turndown. Unless WPB ignores this old producer in favor of constructing entirely new furnaces with critical materials, largely needed elsewhere, it is still possible that the coast may soon have this as its first merchant pig iron producer.

FRACTION OF A CONVOY: This is a small part of the huge Anglo-American convoy that brought invasion to North Africa. Shortly after this picture was taken, American troops landed at three different points.

Press Association, Inc. Photo





Making the Enemy DIE

FOR HIS COUNTRY

VICKERS

**HYDROMOTIVE
CONTROLS**

Soldiers of the U. S. Army are now given this maxim:
"It is commonly supposed that the primary duty of
a soldier is to die for his country. This is not true.
It is his duty to make the enemy die for his."

The spirit of aggressiveness which this reveals should
be heartening to every American, and all Americans
will want to do everything they can to make the enemy
"die for his country" in this war of survival.

Vickers Incorporated is contributing to this effort
on many fronts. Vickers Hydromotive Controls on our
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into this sort of heroism. These high pressure oil
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Since 1921

Fatigue Cracks

BY A. H. DIX

C'est la Guerre

• • • Among the minor crosses borne by your favorite family journal is the difficulty of painting quickly a picture of its field. We envy those publications that cover a single, easily defined market. They can say, "We reach the bakeries—or the cemeteries—the pet shops or the candy makers." And instantly you get a conception of a definite field, in kodachrome.

But when we say, "We cover the metal products industry," your eyes do not dance, for the term is as bloodless as a bloater. So we are obliged to ornament it with alliterative extremes. "You know—everything from bedpans to bulldozers, garter buckles to gantries, razors to reapers, meat molds to manhole covers, auto-claves to autocars." Over the years we have accumulated a handsome collection.

But now with the industry switched over to war goods these have to be shelved f.t.d., and we have to cook up a new batch. So far all we have been able to think of are bullets to battleships, fuse caps to field kitchens, tent pins to tanks, and mess kits to mortars. The assortment is puny so far, we know, but it will grow. We would like to work shell in somewhere, but we don't know what to combine with it.

Abdominal Accident

• • • A.W.M. remarks on an intestinal coincidence in the Nov. 12 issue. The Reading Chain & Block Corp. adv. on page 122 is headed, "Good Guts that Help Billet Grinding," while four pages farther on in the issue is the Vonnegut Moulder Corporation's message, captioned, "Here's a Grinder with Guts."

"The Gremlins will Getcha . . ."

• • • Stan Brams, your Detroit ear-to-the-grounder, tells us that the other day he saw a technical movie showing how aircraft engines are made in a certain plant. He enjoyed it, even the part where the commentator speaks of a certain piece as being made of "forged cast aluminum."

She Said We're Pro-Jap

• • • The news from our Detroit staff is exciting this week. Bud Chamberlin reports that in one office he called on he was asked, "Is there any truth in the story that THE IRON AGE has been heavily fined and punished by the Government for printing pro-Jap articles?"

"Bless you, no," he said, "Where did you hear that?" His informant replied that a young lady who calls regarding a certain type of new-transmitting equipment had passed the good word along.

Our own Cheka is investigating, but to say merely that there is no truth in the statement does not satisfy us. We would like to know how it started, and have been doing some soul-searching. Last week we did quote from the writings of the famous Japanese metallurgist, Dr. K. Honda. The quotation began, "On the assumption that a body of steel just below its solidification temperature is saturated with 0.0023 per cent hydrogen. . . ." But that is hardly subversive.

We have even been careful enough to refer to Japanese beetles as victory beetles, and German measles as liberty measles. And when we are asked, "French or Italian vermouth?" we always answer, "French—Free French, of course."

Our only other recent reference to Nippon recently was the Jap industrial map we published in the Apr. 30 issue. Jim Rowan, Tom Lloyd and Frank Winters of the brains department worked this up from information laboriously gathered from here and there. Not only were we not fined, nor punished, nor rebuked, but on the contrary we were highly praised by the Government for our enterprise. Ever since the map ap-

peared we have been getting a steady stream of requests for it from different Government departments and from others. We don't know whether it helped General Doolittle, but we expect it to be used frequently during '43.

We would like the Detroit young lady to know that nothing exists between the United States Government and your favorite family journal but the most abounding love.

Courtesy—To the .0001 In.

• • • Deac sends us a notice issued by the New York Institute of Finance to the effect that a course in Japanese is being conducted. The notice reads, "The course will be simplified by eliminating grades of politeness unnecessary for men in the armed forces."

"How many grades do you suppose," asks Deac, "can safely be eliminated?" The question is purely rhetorical and an answer would only annoy him, as he asks it only to introduce what he swears is a true story:

When a big Wall Street bucketshop crashed during the happy Hoover days, the general newspaper reporters who came down to Wall Street to cover the event, sought advice from the dean of financial newsmen.

"This is a little different from general news," said the dean. "Down here you must be polite—polite but courteous. Come with me and I'll show you," and he led the group to the bucketshop office.

"Where's So-and-so?" he asked a clerk, naming the senior partner.

"He's out."

"Well," said the dean, "where's the other s.o.b.?" Then turning to his followers, he added, "Be polite but firm."

Stoppers

• • • General Lee rides again—Bethlehem Steel Co.

One died from Shell Shock—General Electric Co., Bloomfield, N. J.

Neurotic Forger

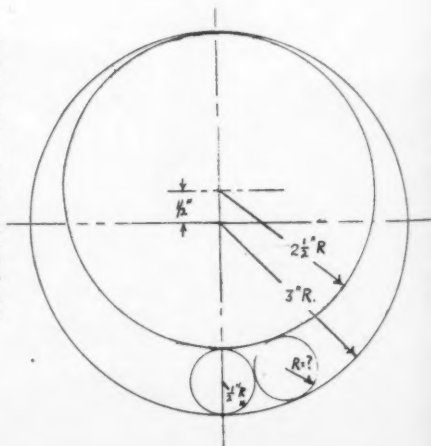
• • • Tom Lloyd says he heard about a forging hammer operator who sings to himself, "I've got nerves that jingle, jangle, jingle." We, too, read it, in the New Yorker and wouldn't mention it if we hadn't just heard that Wrigley, the chewing gum concern, will have an adv. in next week's issue. Maxillary exercise soothes the nerves. But we don't know whether it will help the forging hammer operator, as there are some people who are maddened by asynchronism, and if he is one of them, the attempt to time his jaws and hammer would only make him worse.

Apronym

• • • Robert L. (Stevens Tech) Klein sees an aptronym in the fact that J. W. (Induction Heating Corp.) Cable is an electrical engineer. Which encourages us to mention that in the Navy Department's Office of Inspector of Naval Material, Pittsburgh, is Lieut. T. H. Cable, U.S.N.R.

Puzzle

To make up for last week's kindergarten exercise (answer, 301 potatoes) we give you this skull cracker sent in by N. R. Miller of Joseph T. Ryerson & Son. Your job is to find the radius of the small circle in the lower right quarter. Mr. Miller thinks the answer is .4999471 and seeks confirmation or denial.



There's *No Time* for *"Time Out!"*



WORKING overtime—without letup—conservation of materials is the order of the day! And that goes for motors, too.

Allowances for overload and service factors are out for the duration. Yet your motors have to stay in there and pitch . . . hour after hour, day after day. They have to keep on going . . . starting, stopping, and reversing . . . with no time for "time out."

Reason enough why you should use your priority to buy Fairbanks-Morse Motors! The *only*

motors with rotor windings centrifugally cast of **COPPER**, they're precision built for years of service . . . no stoppage, no breakdowns, no let-downs—*now* or later!

Speed production with F-M motors now . . . and after the war. Ask for a demonstration. Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ill.

FAIRBANKS-MORSE



**MOTORS
DIESELS
SCALES
PUMPS**

Dear Editor:

SALESMEN'S SCRAP DRIVE

Sir:

Mr. Van Deventer's editorial "Deadline, 1942" should be the Pearl Harbor of the current scrap drive. The search for the vital scrap may be paralleled to the attitude of our citizens since October, 1940, when the Draft act was passed. Just as the public remained complacent for fourteen months before Pearl Harbor, so have the producers of scrap remained calm as the danger of down furnaces became more and more serious since the normal sources of scrap disappeared.

We of the American Steel Warehouse Association are finally alert to the peril of our war effort if scrap is not found immediately. We have organized our sales personnel, numbering more than 1000 trained men, and our 354 member firms have ordered them to give right-of-way to the immediate job of calling on 20,000 industrial plants where huge tonnage of scrap lies dormant in the form of unused machinery, obsolete jigs and fixtures, broken tools, abandoned boilers and piping, etc.

Your editorial will awaken the readers of your great paper to the very real danger of losing the war if the dormant scrap is not turned in forthwith.

J. J. HILL, JR.,
National Chairman, American
Steel Warehouse Assn.,
Dormant Scrap Committee
2617 Fidelity-Phila. Bldg.,
Philadelphia

WELDING ELECTRODES

Sir:

I would like to get some information on the manufacture of welding electrodes.

If you have anything on this matter, please rush it to me, as I am starting to manufacture this product.

HERMAN SWADLEY,
Los Angeles, Calif.

• In general the subject of welding rod coatings is a secret one. The only information we know of is in the Bureau of Mines, Washington, D. C., Circular 7121, June, 1940, "Minerals Used in Welding." It tells about the minerals and cellulose compounds that have been tried and the sources of many of these materials. You should also get a copy of tentative specifications for arc welding electrodes, A233-42T, published by the American Welding Society 29 W. 39th St., New York.—Ed.

FLAME HARDENING

Sir:

On page 230 of the October 1 issue, we note two processes. One of these is known as "Flame Annealing" and the other as "Flame Hardening." Can you advise us where we can obtain

information about jobbing firms in a position to do this work? These should preferably be in the Philadelphia territory.

F. W. MILLER,
Yarnall-Waring Co.,
Philadelphia

• Try the Metlab Co., 1000 E. Mermaid Lane, Philadelphia.—Ed.

RIFLING BY BROACHING

Sir:

Our Small Arms Factory in Australia has seen an article by the Illinois Tool Co., in the June 19, 1941, issue of THE IRON AGE on "Gun Barrels Rifled by Broaching." I have been asked to try and obtain a copy for air mail dispatch.

ALFRED MEALAND,
War Supplies Procurement,
Commonwealth of Australia,
New York

SOLDERING BONDERIZED SURFACES

Sir:

I read with considerable interest your article on chemically treated black plate, which appeared in the Apr. 30 issue, entitled "Food In Cans."

However, there was one statement in this article to which I would like to take exception, this statement being to the effect that bonderized plate cannot be soldered.

I have developed three separate fluxes, one of which contains $\frac{1}{2}$ of 1 per cent free HCL, the others containing no free acid and all three of which I believe can be used successfully to solder bonderized plate.

E. H. MUNDELL, JR.
R.R. No. 1, Box 316,
Gary, Ind.

• The can companies may be interested.—Ed.

FILTER

Sir:

Referring to the article, "Centralized Steel and Distribution System," on page 59 of your Oct. 22 issue, mention is made of a 12-ft. diameter settling tank in which is used a self-cooling cleaning filter.

Would you be kind enough to tell us who makes this filter?

HORACE E. DALE,
Vice President
Oliver Brothers, Inc.,
New York

• S. F. Bowser & Co., Inc., Fort Wayne, Ind.—Ed.

LITTLE STEEL FOUNDRIES

Sir:

We are wondering if you might have any extra prints of the article "Rapid Metallurgy in War Production," THE IRON AGE, April 23, 1942, p. 31. Also the article on "Yocum

Process" in THE IRON AGE, Oct. 31, 1940, p. 52.

The writer for the War Production Board in Nashville is interested in the conversion of several of our foundries to small steel casting plants. The problem of getting rid of the phosphorus has heretofore been very difficult and we are interested in the above articles for that reason.

J. C. CARLIN,
Production Manager
War Production Board,
Nashville, Tenn.

INDIAN MANGANESE ORE

Sir:

There is a large field containing high grade manganese ore which is at present shipped to America as raw ore.

Owing to the present shortage of shipping, sufficient quantity cannot be sent out. Therefore, we like you to let us know if it is possible to process this ore to reduce its volume and weight and make it more valuable so that it can be sent through the ships, occupying much less space.

The present analysis of this ore is about 40 per cent manganese, 14 to 16 per cent iron, 1.5 silicon, 0.05 per cent phosphorus, sulphur nil.

The locality has no mineral fuel available and consequently making of ferromanganese by the blast furnace process is out of the question.

It is likely in the very near future that Hydro-Electric power will be available.

Can you please suggest to us such products that can be made from this material under the above circumstances which can be used for the war effort?

KIRLOSKAR BROTHERS, LTD.,
Kirkoskarvadi, India

CUTTING TOOL SALVAGE

Sir:

After reading your recent article, "Tool Conservation in the Navy" (Aug. 28, p. 56), I became interested in the paragraph on atomic hydrogen welding of high speed steel cutters or the building up, by welding of broken teeth.

I am very much concerned with the salvaging of broken cutters and was wondering if you could give me information as to the procedure of building up broken teeth with weld, by the atomic hydrogen process, or possibly a source as to where I could obtain the desired information.

N. H. NIELSEN,
Tool Engineering Dept.,
Salvage Section
Brown-Lipe-Chapin Div.,
General Motors Corp.,
Syracuse, N. Y.

• General Electric Co., Schenectady, N. Y., sole manufacturer of atomic hydrogen welding equipment, has a pamphlet on the subject. Also see the article, "Broken, Multi-Edge Tools Reclaimed by Welding," page 68, Oct. 22 issue.—Ed.



★ MORE FIGHTING EQUIPMENT ★ gets there a trifle faster WHEN T & W FORGINGS ARE USED



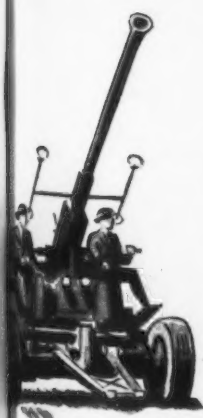
Pre-Inspected, They Reach the Assembly Line Sooner!

One purpose of inspection is to lessen the time it takes for forgings to get onto the assembly line. T & W inspectors are paid by us to actually work for you. Their primary task is to protect you from receiving forgings that might involve a waste of materials or waste of time in finishing forgings.

Inspectors are human. They must be trained to practice an unwavering enforcement of fixed standards controlling the uniformity of physical structure and the size, shape and surface finish of forgings. Since T & W forgings usually embody more than the specifications call for, T & W inspectors must check more than the specifications call for. This thoroughness is practically a pre-inspection from your standpoint, and makes possible a reduction of your own checking detail which, in turn, avoids delay and cuts your expense of checking to a minimum.

Every T & W inspector knows the relation of close tolerances to faster machining and finishing. Consequently, tolerances, along with all the other essentials, are checked without fear or favor of forging craftsmen, or of production executives, for T & W inspectors are responsible directly to management itself. Beginning with the laboratory inspection of steel, and ending with a close visual and technical inspection of forgings, involving the use of modern mechanical devices, T & W inspectors spot the forgings which fail to meet T & W standards, and reject them before they reach the shipping department.

Inspecting forgings with a thoroughness that merits the term "pre-inspected" leads to the betterment of production techniques, and steps up the production and finishing of forgings so that they reach the assembly line sooner and the fighting zone a trifle faster. Ask a T & W Forging Engineer about pre-inspected forgings.



FORGINGS

**USUALLY COST LESS
AT THE POINT OF
ASSEMBLY**

TRANSUE & WILLIAMS STEEL FORGING CORPORATION

ALLIANCE, OHIO

SALES OFFICES: NEW YORK • PHILADELPHIA • CHICAGO • INDIANAPOLIS • DETROIT • CLEVELAND

This Industrial Week . . .

- **Plane, Ship Programs Get Green Light**
- **Emphasis Shifts From Tanks, Other Items**
- **Stop Orders Reflect War Strategy Changes**
- **Batcheller Explains Lower Steel Backlogs**
- **Ingot Output Declines Half Point to 99.5 Per Cent**

VOLUME changes in weapons being produced for the American armed forces and their Allies were reported this week all along the home production front.

Airplanes and ships are now at the top of industry's "must list" and will get the green light in every case where there is a conflict for materials and equipment between those items and other weapons now likely to play a less important role in American war strategy.

Results in this sweep of emphasis from one type of weapon to another will show that U. S. industry has become as maneuverable as the strategy of the armed forces. Lessons from experience in North Africa and in other theaters of war are being rapidly learned in the nation's workshops.

During the shift from one type of weapons to others, U. S. industry will note that the war is still a war of metals and that the nation still needs more supplies and equipment made of metal than it can produce in a short period. The shift affects only the form of the metals; it will hardly affect the volume.

That more ships, planes and bombs are going to be made in 1943 than had been originally planned was disclosed Monday at WPB. The shift in production emphasis, marked by decreases in programs for manufacturing tanks, small arms ammunition, and other ordnance items, may become more marked as soon as the showdown fight over control of production is settled.

The disputants are Donald M. Nelson, WPB chairman and Brehon B. Somervell, Army chief of Services of Supply.

THE merchant shipping program for 1943 is being revised upward from 16,000,000 deadweight tons to 18,000,000 or 20,000,000 tons. The Maritime Commission, according to steel authorities, would have had no difficulty in getting out 8,000,000 tons of shipping in 1942. Admiral Vickery last September is reported to have said that the Liberty Ship Program was proceeding at a rate of 11,000,000 tons a year. But a demand for different types of ships for direct military purposes, is said to have so slowed down the merchant ship program that only 9,000,000 tons will be produced in 1942. An additional 4,000,000 tons of shipping would mean the diversion from other programs of approximately 1,400,000 tons of steel, chiefly plates. Full details of the change in production, it is said, await the outcome of the North African Campaign which will prove the test of weapons that should be emphasized or de-emphasized.

The difference between Mr. Nelson and General Somervell concerns the power of Mr. Nelson to withdraw authority over production scheduling and expediting which he granted to the armed forces last March. The row started when Mr. Nelson delegated authority over aircraft scheduling to Charles E. Wilson, WPB production vice-chairman, about 10 days ago.

Mr. Nelson sent the order to Secretary of War Henry L. Stimson and Secretary of the Navy Frank Knox, for their concurrence, as a matter of courtesy. The order which would give Rear Admiral Ralph E. Davison of the Navy Bureau of Aeronautics and Maj. Gen. Oliver P. Echols, Army aircraft specialist, places on the newly-created Aircraft Production Board, now only bears one signature, that of Mr. Nelson. Moreover, the War Department and the Navy Department have not named these officers to the posts created by the order.

If Mr. Nelson, who visited the White House on Monday, presumably to discuss this situation, is upheld by the President, it may be expected that WPB, not the Army, will soon schedule and expedite all sorts of weapons.

FOR the war plane industry, the WPB has opened the way for manufacturers to obtain any and all machine tool equipment needed to speed plane production. This was done through amendments to the Priority Order E-1-B. Already the amendments have caused some cancellations of machine tool orders by manufacturers other than aircraft materials. But the airplane speedup, in which the 1943 goal will be double that of 1942, evidently does not include airborne freight carriers. Cancellation by the government of Nash-Kelvinator's contract to build flying boats on the Gulf Coast was spectacular evidence of changes in war strategy, suggesting a growing belief that waterborne vessels (enough of them) can do the job in this war. This step seems to be a temporary setback to expectations in some quarters that the flying freight train system would be highly developed in the U. S. before the war's end.

Cutting off the cargo-carrying plane program when it was farthest along may explain the cool reception given proposals by shipbuilders Henry Kaiser and Andrew Higgins when they recently sought to enter the field, Stanley Brams, Detroit Editor, THE IRON AGE, writes on page 76.

Coming close upon the heels of successes in Africa and the Pacific, readjustment of production schedules of war material is particularly noticeable in the Chi-

cago area. There several plants, recently completed, have received stop orders, and individual contracts for a number of items such as shells, shell parts and tank parts, have either been cancelled or reduced. Censorship makes it impossible to discuss the exact proportions of these production schedule revisions but many plants are likely to be affected.

Attainment of the selective stage in war implement production is bound to have an effect on steel production. As long as emphasis is on certain strategic products such as plates, bars and munition steel, production will remain lower in such items as tin plate, wire, shapes and reinforcing bars. This creates the possibility that at certain periods in the next half year more steel may be available for essential civilian needs.

PROSPECTS that some steel may be available for essential civilian use during 1942 were discussed this week by Hiland G. Batcheller, director of the WPB Iron and Steel Branch.

"It is true that the backlog of orders on the books of producers is lower than it was several months ago. However, this is a direct result of actions taken by the WPB to restrict the tonnage of steel which can be purchased so that it may be related more closely to the available supply."

"Such action has been taken through the Production Requirements Plan and by numerous limitation and conservation orders eliminating the use of steel for non-essential purposes and curtailing its use for many other needs."

"Under such a program it is only natural that the demand for certain steel products will be much lighter than for others. Typical of this are the steels for construction purposes such as structural shapes and concrete reinforcement bars. The need for such types of steel is steadily diminishing as we near the completion of the war construction program. However, at the same time the demand for other types of steel—such as alloy steel, so important for aircraft and tanks—is steadily growing."

"It is one of the responsibilities of the Steel Division to direct production into the products most urgently needed for our war effort and essential civilian requirements. This we are doing and will continue to do through every possible means."

Recent cancellation and modification of war contracts in the overhauling of war material production is responsible for some of the recent speculation concerning a possible excess of steel. Other results of the overhauling may be (1) some relocation of war work, (2) temporary unemployment in some plants and (3) political pressure by trade and other groups to keep the war contracts "as is."

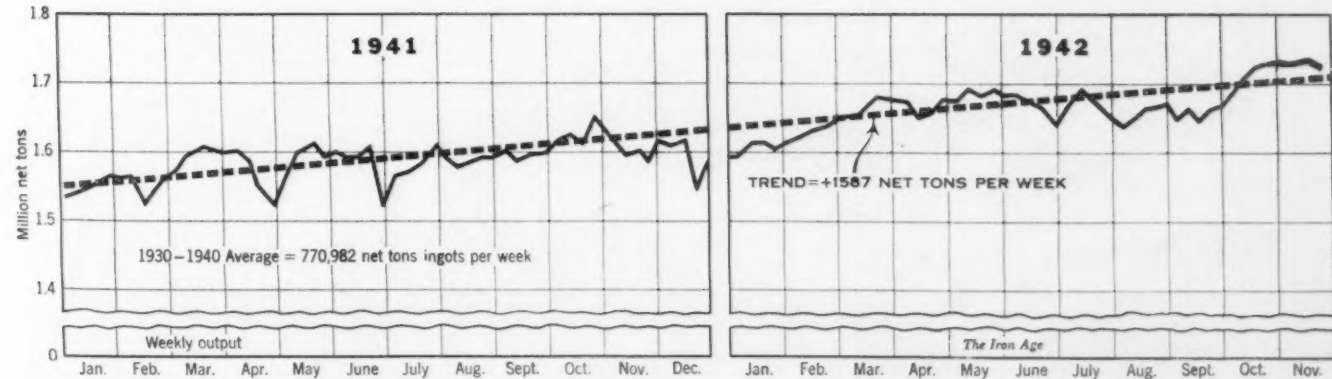
Railroads have been allotted approximately 1,600,000 tons of steel with the program providing for 250 steam locomotives for delivery in the first eight months of 1943, 36 road diesel locomotives in the same period, and 100 switching diesels and 20,000 freight cars in the first six months of next year.

The Association of American Railroads has placed before the WPB a minimum program calling for 80,000 freight cars and 900 locomotives, plus two million tons of rails.

STEEL ingot output in the U. S. this week is estimated by THE IRON AGE at 99.5 per cent of capacity, a half point decline from last week's 100 per cent level. The only steel-producing centers showing gains are Cincinnati, up two points to 105 per cent, and the Eastern District, up eight points to 115 per cent. Chicago dropped a half point to 100.5 per cent and Detroit a half point to 105.5 per cent while Youngstown dipped by the same amount to 100.5 per cent. Melting schedules were unchanged at such centers as Cleveland, Buffalo, Wheeling, Philadelphia, Birmingham and St. Louis.

This week saw the beginning of an educational campaign to familiarize industry with the Controlled Materials Plan. More than 2000 men tried to push themselves into the Hotel Roosevelt ballroom in New York to hear WPB experts explain this system of material distribution and control.

The Iron Age



Steel Ingot Production by Districts Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	S.Ohio River	West	St. Louis	East	Aggregate
November 19...	100.5	102.0	101.0	93.5	97.0*	104.5	89.0	98.0	106.0*	103.0	102.0	107.5	107.0	100.0
November 26...	100.5	100.5	100.5	93.5	97.0	104.5	89.0	98.0	105.5	105.0	102.0	107.5	115.0	99.5

* Revised

AN AUTOMATIC CYCLE for Your Job!

The full range of automatic cycles shown are standard and each cycle is obtainable front or rear. The front and rear cycles can be used simultaneously or independently and require no cams or special attachments.



Write for Bulletin 601 . . . on the unusual features
of The 3A Duomatic

Awarded Navy "E"
March 6, 1942

THE LODGE & SHIPLEY MACHINE TOOL CO.
CINCINNATI, OHIO, U. S. A.

ENGINE

TOOL ROOM

AUTOMATIC LATHES

Beehive Operators Face Difficulties In Coke Production

Pittsburgh

• • • The working out of coking coal mines adjacent to beehive coke plants, the necessity for going far afield in quest of coal supplies, the lack of skilled labor, and the growing increase in absenteeism, are all combining to produce a beehive coke shortage and crises which may be definitely felt before next spring.

This situation was predicted in THE IRON AGE some time ago, prior to the granting of certain price relief to marginal beehive coke plants. Since that time, however, so many additional factors involving the cost of producing beehive coke have materialized that many observers believe production will be seriously endangered.

A good percentage of steel production in the Midwestern part of the country is made possible by the utilization of beehive coke for the production of pig iron. One large Pittsburgh company estimates that at least 15 per cent of its total steel ingot production is dependent upon beehive coke supplies which supplement the by-product at the company's plant. The same general condition applies to practically every steel company in the greater Pittsburgh area.

For years students of beehive coke production have predicted that the high volatile coking coal reserves in Western Pennsylvania would disappear rapidly. Concrete signs have already indicated that many of the more important beehive coke plants will have exhausted nearby coal supplies within six to eight months.

Compared with a year ago when many of the small beehive coke plants were either getting their coke adjacent to the ovens or trucking it distances ranging from five to 12 miles, this past week saw at least 15 per cent of the beehive coke operators searching for and hauling strip coal from 18 to 25 miles to their plants.

While these particular coke plants seem to be only a small percentage of the total involved, the overall coke situation is so tight that any cessation in operations by even such a small group of



JAP TANK: American and Australian soldiers check over every inch of this captured Japanese tank in New Guinea.

ovens would probably shut down one or two merchant blast furnaces. The serious aspect of gasoline and tires, coupled with the present price ceiling on beehive coke, makes it only a question of time as to how long these particular operators can afford to truck their coal 25 miles to the beehive plant. Even in these cases the type of coal being obtained in that relatively long haul is not necessarily of the best quality

and in many cases represents stripping coal from mines which were once considered to be worked out.

Some blast furnaces dependent entirely on beehive coke supplies in the Western Pennsylvania region are on the "ragged edge" and in one case it is known that supplies are being received on a day-to-day basis, a precarious situation for a blast furnace operator. Matching this condition in its se-

riousness is an impartial estimate that two large coke plants in the Pittsburgh-Connellsville district may have to shut down at least 200 ovens within the next six to eight months because the coal supplies adjacent to these plants will have been worked out. This loss in terms of coke would represent approximately 10,000 tons a month.

The tight situation is not restricted to availability of coal alone, but to quality as well. Much beehive coke produced recently from whatever coal could be obtained has been of such high sulphur and high ash con-

tent that one large steel producer who had been lenient in specifications has recently been rejecting carloads. This particular aspect may reach the point where beehive coke plants will be forced to go further South into West Virginia for better coking coal if they are to remain in business. Yet such a move would be made impracticable under the present price ceilings because of the transportation costs.

In some cases, steel companies with their own by-product coke plants are not faring any better, relatively speaking, than some plants using all beehive supplies.

One Shipment Has Rings for 50 Ships

Baltimore

• • • Further evidence of the speed with which Liberty ship production is being stepped up by the United States is found with the announcement that Koppers Co., American Hammered Piston Ring division, is making a single shipment of enough piston rings for 50 ships to a Western shipyard. Ordinarily rings have been ordered for one ship at a time as ships neared completion.

AFRICAN LANDING: While helmet-equipped Army crews make ready, a landing barge (top) slaps against the North African beach and (bottom) drops its ramp for an Army truck to roll into Africa.

Press Association, Inc. Photo



In order to obtain a good coke yield with a good coke structure, practically all steel companies mix low volatile coal with their own high volatile coal. Much of the low volatile coal in the past came from Central Pennsylvania regions, but with these mines running out it has been necessary to go further afield after Southern coals. The problem has been further complicated for the large integrated steel mills because their blast furnace units have been producing far more tonnage than the rated capacity of the furnaces. This is causing a deficiency in by-product coke since the by-product plants were built to a lower pig iron production volume. This situation has forced these steel companies to supplement, more than ever, their by-product coke supplies with beehive coke, as well as requiring greater mixing of the coals going into the by-product plant.

The entire coke situation in Western Pennsylvania involves so many intricacies of balance in supply and quality that astute observers believe the ultimate solution lies in going farther afield for better quality coal. Such a move, however, would entail a review of railroad freight rates, as well as the conditions contributing to the present price ceiling on beehive coke.

If some constructive move is not made before the crisis is reached and if steel production continues at its high levels, it may soon be found that over night hundreds of beehive coke ovens which have been playing an important part in the war have "fallen by the way-side."

Pullman-Standard Airplane Parts Contracts up 1200%

••• War production contracts held by the Pullman-Standard Car Mfg. Co. are 2.5 times to 12 times greater than they were at the time of Pearl Harbor, the company reports in a special issue of its magazine, *Carbuilder*. The company has taken on in 1942 new contracts to build submarine patrol vessels for the Navy and military freight cars for the Army, the report said.

Pullman-Standard now has 12 times as many airplane parts to make as it did before the Japanese attack, while the tank order is eight times greater, gun carriages and mortars six times greater, anti-aircraft welds four times greater and the shell and bomb orders are up 2.5 times.

Since receipt of the company's first war contract in 1940, a total of 5490 Pullman-Standard contracts have been awarded in 170 cities and 20 states to 960 sub-contractors ranging in size from one-man shops to a 150,000-worker company. Seven hundred ninety-five of the firms are in the small business group and hold 4762 contracts.

Training Courses on CMP Slated for Many Cities

Washington

••• Indocrinated by a four-day course at a training school in Washington, WPB priorities specialists and other selected men are conducting mass seminars throughout the country to instruct industry on the workings of the controlled materials plan. Leading these meetings in 24 key cities, these WPB specialists hope to begin a nation-wide series of small group meetings with manufacturers.

The courses will be under the supervision of 70 men who were students at the Washington training school on CMP conducted by the Inquiries, Instruction and Service Branch of the Controlled Materials Division. The branch is headed by Courtney Johnson, former Studebaker Corp. executive. These men have been sent to the various regional and branch offices, taking with them comprehensive material on CMP. In each such office, one of these men will explain CMP to the personnel concerned. A list of the 24 cities

where mass meetings are to be held, the dates of the meetings and the specialists who will attend them will be issued later, WPB said.

WPB is going to make sure that CMP gets a big selling job. Ross-Royd Co., Detroit advertising agency, has been hired to make up an elaborate 125-page "graphic CMP chart." The chart sets forth procedure under CMP and will be produced in color, with extensive art work.

Not satisfied with this, WPB is going to issue CMP primers—one for prime contractors and one for secondary contractors, covering class B products. Also, it is reported that Ernest Kanzler, director general for operations, has proposed that WPB hire high-powered promotional advertising men to go around the country on speaking tours selling CMP to industry. It is understood that this move is not favored in some quarters of the agency.

"FLYING JEEP": That's what the Vultee Sentinel, a small, rugged, highly manoeuvrable plane, is called. It is designed to do liaison work for artillery, tank corps, cavalry and infantry, and is said to hover or maintain altitude at exceptionally low speed while directing artillery fire or troop movements below. It carries a pilot, an observer, and a plethora of radio equipment.



FUTURE TORPEDO MEN: These students at the Navy's submarine school are shown in the forward torpedo room having the mechanism and controls which discharge the torpedoes pointed out to them.

Harris & Ewing Photo





SEWING MACHINES FOR STEEL

(Reading Time—35 seconds)

A few years ago, all arc welding was a time-consuming, "hand-sewn" job. Long continuous welds involved hours of hard work. Heavy metals could only be welded by piling one bead on top of another until the seam was full.



Today, urgent demands for speed are met by Unionmelt*, an automatic welding process which stitches steel together 20 times faster than any other method... half-inch steel plates are welded at the rate of 18 inches a minute.

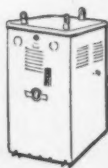


Like thread from a spool, bare electrode is fed to the seam automatically. Welds are flat, dense, and uniformly sound.

Unionmelt is one of the reasons ships are sliding down the ways months ahead of schedule... one of the reasons railroad car manufacturers and boiler companies are beating delivery promises.



To supply the steady flow of heavy current needed, most Unionmelt users choose Westinghouse A.C. Transformer Welders... because the two are made for each other. Together, they form an unbeatable team for single-pass welding of $\frac{1}{16}$ " to $2\frac{1}{2}$ " steel plates.



*Registered Trade-mark of The Linde Air Products Co.

Find out how you can use this ideal combination in your plant. Write for booklet B-3090.

Westinghouse Electric & Mfg. Co.
Dept. 7-N, East Pittsburgh, Pa.

J-70393

Ore from Steep Rock Lake Reported Satisfactory in Test

Buffalo

••• Hard ore from Ontario with an iron content of 61 to more than 65 per cent has been given its second open hearth test at the Republic Steel Corp. plant in Buffalo with results described by observers as "satisfactory."

Four tons of the ore, taken from the estimated 100,000,000-ton deposits at Steep Rock Lake, Ont., 130 miles west of Fort William, was put through the furnaces in the second all-day test. The first run was 15 tons and the refined metal was sent to the National Steel Car Co. in Hamilton, Ont., for fabrication into anti-aircraft shells.

Cyrus S. Eaton, Cleveland financier, witnessed the second test and said "the hard iron ore from Steep Rock Lake did its job perfectly."

Eaton said the hard ore was being tested because of the scarcity of scrap and the imperative need of a suitable ore, hard in structure and low in impurities, for use in open hearth steel furnaces.

"In producing steel formerly," said Eaton, "the mixture was about 50 per cent each for pig iron and scrap. Scarcity of scrap has altered the mixture to 70 per cent pig iron and 30 per cent scrap."

"Pig iron has about a $4\frac{1}{2}$ per cent carbon content and in order to reduce this to about one-sixth

of 1 per cent it is necessary to use hard ore. Three methods are in general use now to produce such an ore."

Eaton said "the United States will require 15,000,000 tons of hard iron ore, low in impurities, for open hearth furnaces next year."

"We produce only about 1,500,000 tons annually in the United States. The rest is obtained by the methods generally used, which involve more shipping and labor. The hard ore tonnage is vitally needed because of the scrap situation, which is likely to become worse next year."

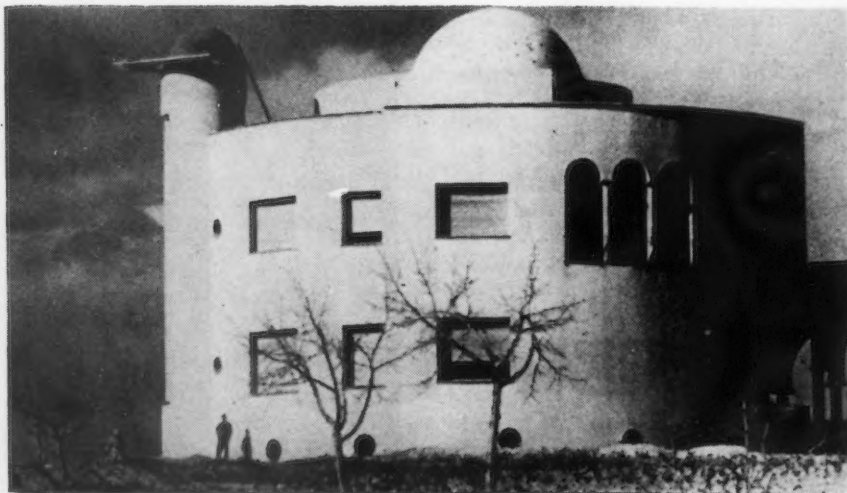
Steep Rock Lake's rich deposit of hard ore has been under investigation for nearly four years, Eaton said, but development will depend on priorities. He indicated a minimum of a million tons could be produced in 1944 and another two million in 1945.

The hard ore lies principally at the bottom of Steep Rock Lake, which would have to be drained and a spur railroad line built. A year of development would be required to begin actual operations.

Steep Rock has been called by Premier Gordon Conant, of Ontario, "the premier open hearth ore of the North American continent," and "its development will make ore accessible in large tonnages—several millions of tons annually—so that the enterprise can be developed on a scope commensurate with the huge quantity available."

FARMHOUSE OR FORTRESS? This is a close-up of one of the many fortress-like farmhouses built by Italian residents in Tunisia, which French colonists claimed were easily convertible for military use. American troops may run up against buildings of this type.

Press Association, Inc. Photo



Commerce Department Issues Screw Thread Standards

••• The recommended commercial standard for screw threads and tap drill sizes which was circulated to industry during the summer has now been accepted and will be considered effective for new production beginning Feb. 10, 1943, according to the Department of Commerce. This new standard, which is identified as CS24-43, is a revision and consolidation of similar standard CS24-30 and CS25-30, originally prepared by the National Screw Thread Commission. Copies of the new standard are available from the National Bureau of Standards, Washington.

In the first section of the standard, tolerances of all the principal dimensions of the following screw thread series are tabulated:

Coarse thread series, sizes No. 1 (0.073) to 4 in., Classes 1, 2, 3 and 4 fits.
Fine thread series, sizes No. 6 (0.060) to 1½ in., Classes 1, 2, 3 and 4 fits.
8-Pitch thread series, sizes 1 to 6 in., Classes 2 and 3 fits.
12-Pitch thread series, sizes ½ to 6 in., Classes 2 and 3 fits.
16-Pitch thread series, sizes ¾ to 4 in., Classes 2 and 3 fits.
Extra-fine thread series, sizes ¼ to 2 in., Classes 2 and 3 fits.

In the second part of the standard, the corresponding tap drill sizes are given. The minor diameters of the tapped holes are the same for screw thread fits Classes 1 to 4 inclusive and, therefore, a single drill size applies. In the table, the percentage of basic thread depth is given for the nearest commercial drill size to the nominal minor diameter of thread.

The same dimensional data on screw threads and tap drills are recorded more completely in "Screw Thread Standards for Federal Services—1942," published as National Bureau of Standards Handbook H28.

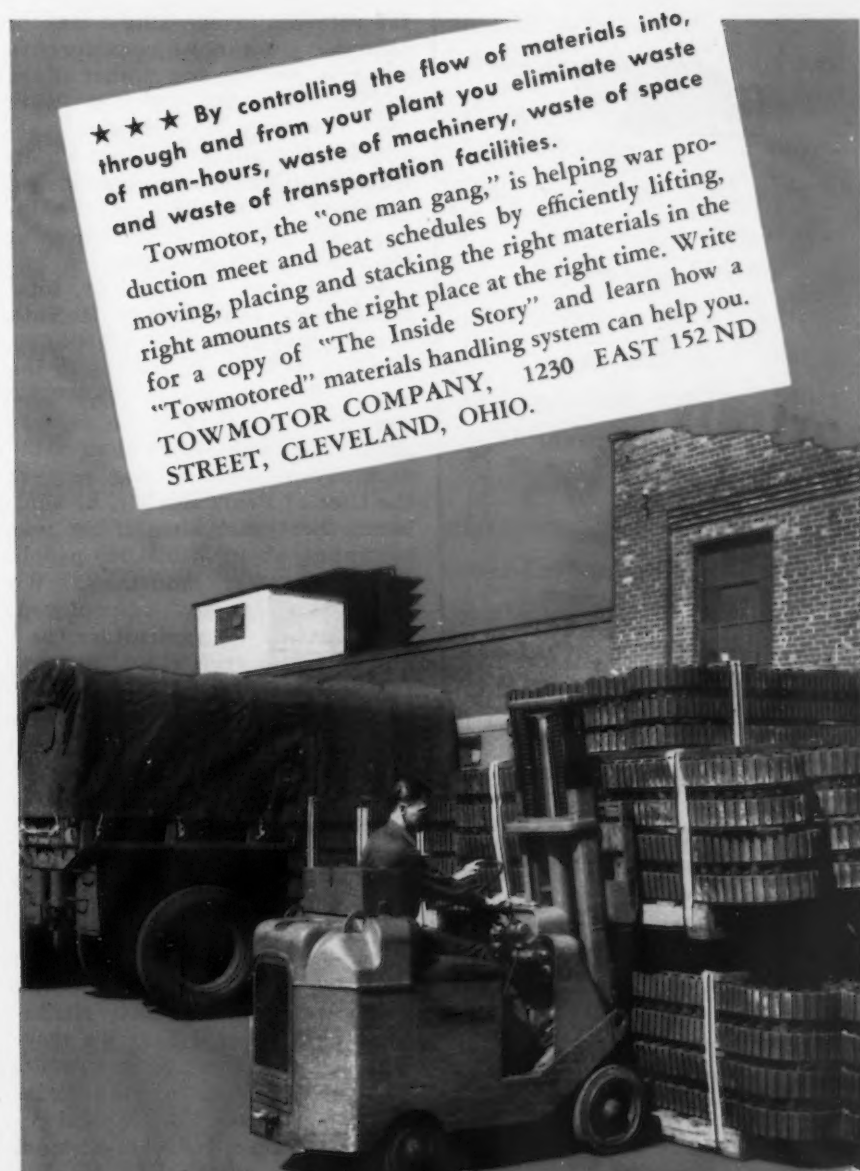
C-I Workers Set New 30-in. Plate Mill Record

Chicago

••• Workers on the 30-in. universal plate mill of the South Chicago works of Carnegie-Illinois Steel Corp. celebrated Armistice Day by setting a new production record. On Armistice Day the 30-in. mill brought its 1942 production to date to 385 tons more than its total production in all of 1941, thus accomplishing in less than 11 months this year what had required 12 months a year ago.

★ ★ ★ *More Opportunities are Concealed in Movement of Materials* THAN IN ANY

OTHER SINGLE FUNCTION OF PRODUCTION



★ ★ ★ By controlling the flow of materials into, through and from your plant you eliminate waste of man-hours, waste of machinery, waste of space and waste of transportation facilities.

Towmotor, the "one man gang," is helping war production meet and beat schedules by efficiently lifting, moving, placing and stacking the right materials in the right amounts at the right place at the right time. Write for a copy of "The Inside Story" and learn how a "Towmotored" materials handling system can help you. TOWMOTOR COMPANY, 1230 EAST 152 ND STREET, CLEVELAND, OHIO.

Stacking and loading armored car treads is one of many jobs Towmotor is doing to speed war production.



TOWMOTOR

THE 24-HOUR ONE-MAN-GANG

THE IRON AGE, November 26, 1942—99



Services of All Are Needed, McNutt Says

Pittsburgh

••• The situation in U. S. war production today is such that the country cannot afford to discard the services of one single man or woman who can be considered a potential worker and cannot afford to lose one single day of work that can possibly be saved, according to Paul V. McNutt, chairman, War Manpower Commission, speaking to members of the Industrial Hygiene Foundation at their annual meeting here.

By the close of the year, total labor force, according to McNutt, will number more than 59,000,000. More than 5,500,000 will be in the armed forces. About 18,000,000 men and women will be in war production jobs—more than twice as many as were in war jobs at the time of Pearl Harbor, he said. In another year's time, if the war continues, about 30,000,000 people will be in war industries. We shall have fewer unemployed, fewer people in agriculture, and fewer to man the essential non-war services and industries.

Mr. McNutt said that of the 50,000,000 women aged 14 and over listed in the 1940 census, nearly 15,000,000 are already at work. Although the remaining 35,000,000 are the nation's principal remaining labor reserve, not more than 13,000,000 of these will be available to industry, he said.

Pleading that in total war we must use all our people and not disqualify them for their limitations, McNutt said that we must use them for what they can do. The old idea that an industrial worker must have the physical requirements of a 1-A or 1-B, must be thrown overboard, McNutt warned.

Subscribing to the formula of an eight-hour day and a 48-hour week for war work, McNutt asserted that fatigue is the most effective saboteur in the war effort.

Tying in with some of McNutt's statements was a talk on a scientific solution of the multiple shift problem by Prof. Nathaniel Kleitman, Department of Physiology, University of Chicago, who introduced a novel scheme for changing shifts which, if followed, would have employees sleeping at the same time each day when on the same shift.

Prof. Kleitman advocated the rotating of shifts once in several months, if at all, instead of weekly or bi-weekly. He further advocated the abolishment of the "graveyard" shift, by setting up working turns to begin at 4 a. m., noon, and 8 p. m.

He argued that it takes several weeks for a new 24-hour sleep-work-meals-leisure cycle to be properly established and said that such achievement is wholly impossible under a system of weekly or bi-weekly shift rotation.

\$12 Million for First Unit Of New Alabama War Plant

Birmingham

••• A new war plant to be operated by the Bechtel-McCone-Parsons Corp., of Los Angeles, will be built in Alabama, according to announcement made here Nov. 14. The Reconstruction Finance Corp. has approved a \$12,500,000 appropriation for immediate construction of the first unit of the development.

ASSEMBLY JOB: Henry J. Kaiser demonstrates on an 81-piece, 14-ft. model, how his Richmond, Cal., shipyard launched a 10,400-ton Liberty freighter in 4 days, 15 hr. and 26 minutes.

International News Photos



portrait of a heart . . .

Without it a thousand bombs can miss their mark. Upon its ability to function perfectly in temperatures which may vary a hundred or more degrees in as many seconds can well depend the fate of a nation.

We are privileged to supply springs which are necessary for the successful operation of precision bombsights and the same accuracy of manufacture which is so essential in its production is available to you.

Write, wire or better still . . . phone us!

AMERICAN
SPRING OF
HOLLY, INC.
HOLLY, MICHIGAN





APPOINTED TO WLB: Carroll R. Dougherty, Professor of Economics at Hunter College, New York, who has been appointed director of the Division of Review, Research and Analysis for WLB will also serve as economist for the board. He was formerly an assistant in the Wage and Hour Division until his resignation in 1939.

Philadelphia Foundrymen Told of Charging Methods

••• Stanley H. Bullard, of the Bullard Machine Co., Bridgeport, spoke on foundry operation methods at a meeting of the Philadelphia chapter of the American Foundrymen's Association Nov. 13. Mr. Bullard said that his company mixes coke, scrap, and iron together in each charge, with no attempt to keep the materials separate. He said this means a considerable saving in charging labor, with no perceptible difference in the melting rate or quality of iron produced.

Demand for Steel Seen Easier in Birmingham Area

Birmingham

••• Demand for practically all steel products has slackened substantially here during the last few weeks.

This decline does not presage any reduction in production since backlogs, of course, are still extremely heavy.

Apparently this marketing condition change is due, at least in part, to an improvement in distribution.

Manganese Steel Pig Machine Parts Last Longer, Save Weight, Increase Production

Any one of the advantages of 13% manganese steel wheels would justify their use in pig-casting machines. Their *combination* of properties makes them a "best buy" even when the first cost of chilled wheels made from blast furnace iron is much less.

The experienced user of 13% manganese steel knows its tough resistance to shock stresses, which exceeds that not only of chilled iron, but also of any other steel. He knows, too, that manganese steel surface-hardens under friction and pressure without reducing the toughness of the body metal.

Also, because of its high tensile strength and ductility, manganese steel wheels of lighter weight, sometimes half the weight of chilled iron, are adequate to any pig machine service. Lighter

weight means less power consumption and a saving in metal and man power.

Regardless of first cost comparisons, which superficially favor blast furnace iron, the longer life of manganese steel wheels, their lighter weight, the reduction in maintenance time, and *more continuous operation* effect substantial savings. And what is more important right now, they help to *increase production*.

Not only wheels, but also manganese steel links and pins, are a better buy — and they are made for all types of machines, at any of the six Amsco foundries spotted from coast to coast.

A typical shipment, and wheel and link assemblies are illustrated. A new 48-page catalog, describing all manganese steel uses in blast furnace, coke plant and rolling mill equipment, will be sent on request.



Amsco
AMERICAN MANGANESE STEEL DIVISION
OF THE AMERICAN BRAKE SHOE & FOUNDRY CO.
Chicago Heights, Illinois
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

Genuine Manganese Steel, "The Toughest Steel Known"
Chromium-Nickel Alloy Castings for heat and corrosion
Power Shovel Dippers. Dredge and Industrial Pumps
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CAPACITIES:
250, 500, 1000 and 2000 Pounds



Saves Skilled Labor—With Zip-Lifts, machine operators can handle and position their work more quickly and accurately. Both men and machines can produce more.

Speeds Production—By keeping materials moving along at double-quick time. "Thru-the-Air" handling with a Zip-Lift eliminates aisle congestion and prevents accidents.

Relieves Worker Fatigue—One man, with only one hand on the magnetic push-button control, can operate this hoist—leaving one hand free to guide the load.

LOOK WHAT YOU GET IN A ZIP-LIFT

Full magnetic push-button control, real wire non-spinning cables, three-way interchangeable mounting, safety type limit switch, double safety brakes, all-weather fully-enclosed housing. These and many other features make Zip-Lift your best buy in electric hoists. Literature on request.



Awarded the Navy "E" for excellence in war production. P&H displays it also as a pledge of future effort.

General Offices: 4401 West National Avenue, Milwaukee, Wisconsin

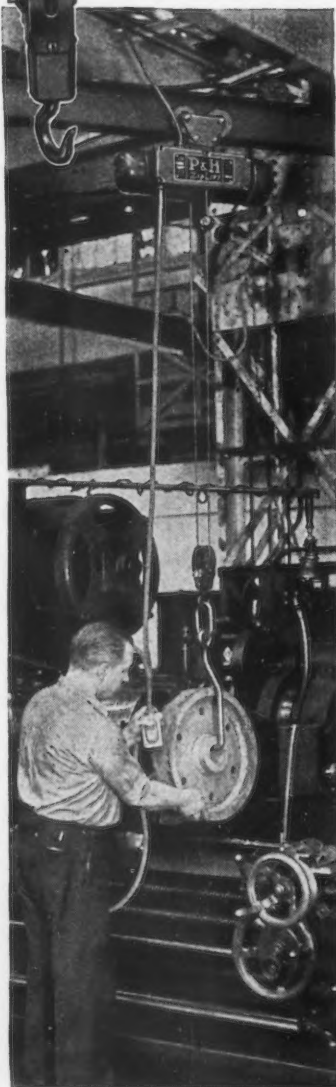
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NEWS OF INDUSTRY

Grace Reports New Steel Capacity; Urges Still Higher Goals

• • • Calling present peak production "not good enough," B. G. Grace, president of Bethlehem Steel Co., urged still higher goals, in a message to employees issued Nov. 19 while two new open hearths on the Pacific Coast add 100,000 tons of steel ingots to the company's annual capacity.

"We can't afford to be complacent because we beat schedules by weeks or months," said Mr. Grace. "We have recently had reports of many actions which show what our armed forces can do if they have the proper equipment . . . the issue might be decided by a narrow margin of equipment at a certain place, at a certain time." Stating that there are 18,000 Bethlehem employees now in the fighting services, as well as many thousands of kinfolk, he urged Bethlehem workers on their part "to see that our armed forces get, promptly and in abundance, the tools they need for the job."

Numerous peak records by Bethlehem were cited in the company magazine, which pointed to Bethlehem's large combined naval and merchant shipbuilding program; and its heavy production of heavy ordnance, including gun forgings, forged armor plate, shells, bombs, projectiles, etc.

The company broke its own steel ingot record in October with 1,100,000 tons. Blast Furnace "H" at Lackawanna Plant set a new record in pig iron production—46,246 tons.

Credit is given to the press and the American public for the success of the scrap drive. While stating that "the immediate threat to our production has been overcome," Mr. Grace added, "the situation will continue to be serious. . . I hope the scrap campaign will continue with unabated vigor."

Bethlehem has adopted an unusual procedure this time by carrying full page newspaper advertisements of the Bethlehem Review, summarizing it and inviting the public to write in for free copies. The advertising list includes newspapers in communities in which the company has major steel and shipyard operations.

Chrome Painting Used For Some Ship Plates

Pittsburgh

• • • Involving the processing of plates chiefly for the nation's ship yards, Hanlon Gregory Galvanizing Co. here has evolved a new technique reducing from 20 hr. to 5 hr. the time required for passage of steel plates through the galvanizing process — from entrance to outgoing shipment.

According to A. J. Diebold, president, the company this week completed \$145,000 expansion program including new equipment, which will allow a still greater tonnage increase. One of the new installations is said to enable the chrome painting of steel plates in half the time previously required.

Mr. Diebold explained that due to the shortage of zinc, chrome painting is being substituted for some types of ship plates in order to get quicker production. While not giving as durable protection as galvanizing, Mr. Diebold said that chrome painting would be ample for the purpose of lasting through the war.

The company's new process for galvanizing has enabled them to pass through its plant during the past 12 months, two and a half times more tonnage than was handled in previous years.

PASS THE OPERATION: Workers at the Glenn L. Martin plant in Baltimore have promised this bomber to Hirohito, and don't want to go back on their word, parodies the song.

Harris & Ewing Photo



4 TIME AND MONEY SAVERS for METAL-WORKING INDUSTRIES

1. TO ELIMINATE GRINDING OFF WELD SPATTER . . . *Acme Quality Industrial Finish Flash-Off No. 99.* Mechanic simply sprays, brushes, or wipes FLASH-OFF along edges of metal to be joined by weld. FLASH-OFF makes metal chips bounce off instead of adhering to areas adjacent to weld. FLASH-OFF also helps improve quality of weld. Being an excellent conductor, it helps prevent the weld arc from breaking, thereby producing stronger weld. It also prevents pitting of galvanized, ungalvanized, or "stainless" steel surfaces. Paint can be applied immediately after removing FLASH-OFF with damp rag. Low in cost. Comes in 55-gal. drums—and 5-gal. cans.

2. TO SIMPLIFY SCRIBING INSTRUCTIONS ON SHEET METAL . . . *Acme Quality Lay-Out Dye.* Semitransparent, extremely fast drying (about 1 minute), purple in color. Can be brushed, wiped, or sprayed on sheet metal. Work instructions scribed with sharp stylus or other sharp-pointed tool stand out bright and clear. When work has been completed, remaining LAY-OUT DYE can be washed off with denatured alcohol. Film is so thin that removal is unnecessary in many cases. Comes in quarts and gallons. Now widely used in many large plants.

3. FOR CLEANER THREADS AND SMOOTHER FORMING . . . *Acme Quality Tapping and Drawing Compound.* Better than lead and oil because TAPPING AND DRAWING COMPOUND does not harden on work, whereas lead and oil must be cleaned off immediately. It comes in paste form and is reduced to milky consistency with paraffine or other cutting oil for use in machines with circulating pumps. For sheet metal stamping, it is reduced to consistency of thin paint with any thin oil. Can be splashed, brushed, or sprayed on. Very economical—prevents accelerated wear on expensive broaches, and other cutting tools and dies.

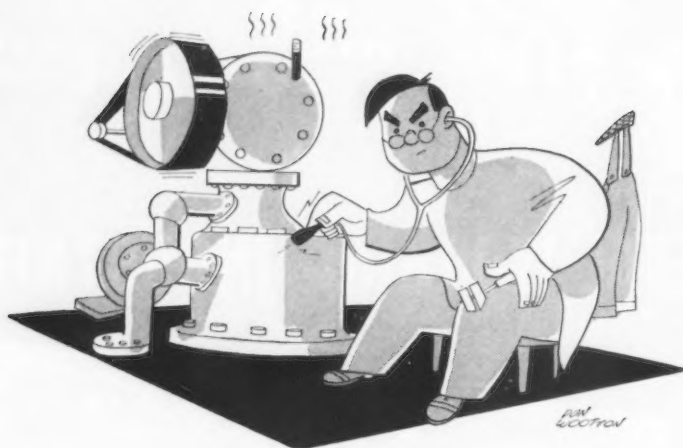
4. FOR FULL-SIZED LAY-OUT WORK ON METAL SHEETS . . . *Acme Quality Velunite Draft Board White.* Widely used by airplane, engines, parts, auto body and truck builders. Draft Board White is designed for 25% reduction with Acme Quality F-40 reducer. You spray on a "mist" coat of least possible film thickness. When dry, spray on full, double crossed coat. Allow to dry overnight. Does not become brittle with age nor chip under compass point.

ALL FOUR OF THESE MONEY SAVERS AVAILABLE THROUGH
ACME BRANCHES LOCATED IN PRINCIPAL CITIES

Full details upon request. Address inquiries to

ACME WHITE LEAD & COLOR WORKS

Dept. E; Detroit, Michigan



AN OUNCE OF PREVENTION

All over the world many of our boys are "under fire" today. Who knows but that they may be in desperate need of weapons that aren't there.

WHY? Because some manufacturers couldn't deliver in time?

WHY? Because subcontractors were behind in their deliveries?

WHY? Because subcontractor's machines broke down?

We can't have breakdowns, today. There isn't time. Minutes are too vital.

Yet, with the wheels of war production turning night and day, breakdowns are more likely to occur.

The answer is *preventative maintenance* . . . which means keeping machines and other facilities in proper condition so that breakdowns will not occur.

This involves the application of the same sound principles of Management Engineering that are applied to all production processes. There must be constant planning and scheduling, checking and rechecking. Today, the risks are so great . . . we must be sure.

And let us never forget, "*Labor is just as efficient as Management plans for it and provides the tools with which to work.*"

Geo. T. Trundle Jr.

THE TRUNDLE ENGINEERING COMPANY

Consulting Management Engineering

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NEW YORK • Graybar Building • 420 Lexington Avenue

Aluminum Capacity of 2.1 Billion Pounds Goal for Next Year

Pittsburgh

• • • The Aluminum Co. of America is now building for the Defense Plant Corp. a total of 21 plants which are located in 14 states. With its own program, this gives Aluminum Co. a total of 41 major projects now under way and brings the company's total acreage of floor space put under one roof since Jan. 1, 1940, to more than 600 acres, Thomas B. Jolly, vice-president, Aluminum Co. of America, told the Pittsburgh Men's Clan of the Carnegie Tech Alumni Federation early this week at the University Club here.

The country as a whole is aiming at an eventual production of

POWER BOTTLE: This steel bottle developed by Walter Kidde & Co., is filled with compressed carbon dioxide and is connected to the piston of a hydraulic system used to open bomb bay doors, lower retractable landing gear or apply brakes. When the system fails or is damaged, the compressed gas is released and operates the pistons. Each cylinder holds a latent force of 30,000 ft. lb. per lb. of compressed gas.



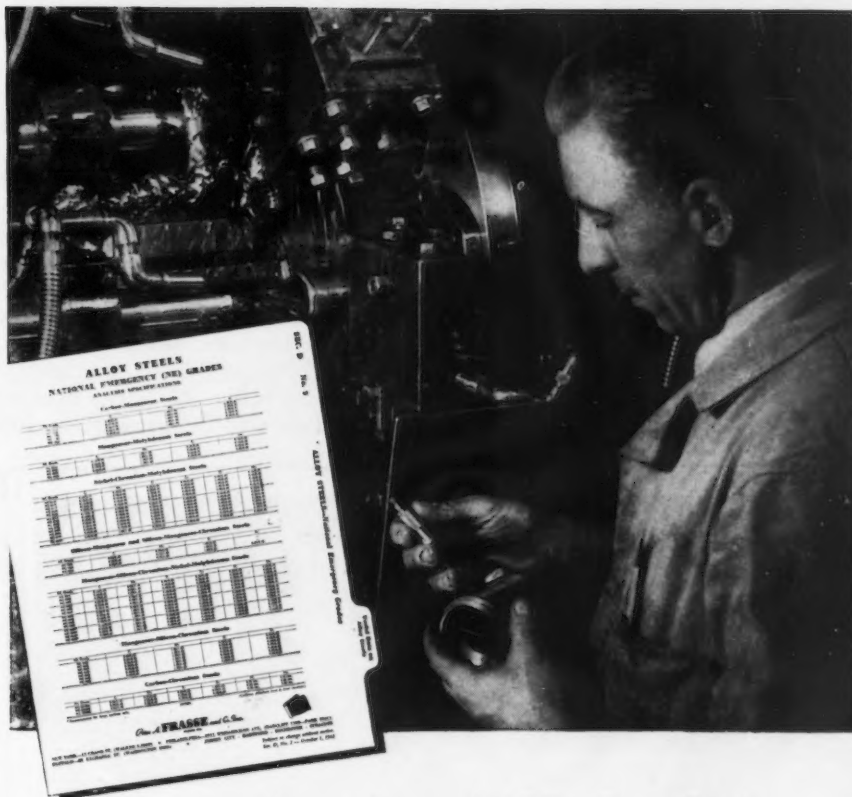
2,100,000,000 lb. of aluminum annually—to be achieved in less than a year from now and which will represent a production seven times the size of the peacetime years of 1937, 1938, and 1939, according to Mr. Jolly. He added that each of several of the new plants will produce more aluminum than the entire nation made at its World War I peak.

Tracing the growth of plans for additional production of aluminum since Munich and emphasizing the foresightedness of Aluminum Co. officials and workmen, Mr. Jolly explained a unique setup in his company which has enabled the construction program of the DPC and his own company to go along smoothly.

Aluminum has set up a coordinating division in the general office at Pittsburgh. This department receives copies of all schedules, purchase orders, and weekly construction reports. In each of the branch offices the company has selected a veteran employee as a regional coordinator. This man has available to him on a first demand duty basis the services of each of the other men in his office. This, it is said, gives a speedy person-to-person contact with Aluminum Co. suppliers.

According to Mr. Jolly, the coordinating division does not assume the prerogatives and responsibilities of the purchasing department. It merely acts for the responsible buyer and relieves him from the duty of following up his purchases. It works with the general construction superintendent to have needed materials and equipment on the job when required. It is not an expediting division and is not supposed to worry suppliers into making shipments. Its main duty, Mr. Jolly said, is to help suppliers obtain materials from their suppliers, and sometimes, from the suppliers of their suppliers. It is a cooperative organization and no small part of its work is with the priorities division.

In analyzing the needs for the production of one pound of aluminum, Mr. Jolly said two pounds of aluminum oxide made from four pounds of bauxite are consumed. In addition, 10 kw. hrs. of electricity is required to separate the aluminum from the oxygen and three-quarters of a pound of carbon electrode is burned. From



Investigating NE Steels? Here's new, helpful data for you!

Already adopted in many war plants, NE steels will be increasingly used to substitute for standard alloy grades. If you are now testing or contemplating the use of NE steels, you'll find this new Frasse chart a handy guide.

Latest of the Frasse Data File series, it shows a complete list of recently revised NE analysis "specs", plus recommended alternatives for standard alloy steels. Both standard and NE grades are grouped, for convenience, according to approximate hardening values.

The chart is regular file size—just right for desk or wall, too. There's no charge—just mail the coupon below. Meanwhile, if you have a specific question regarding the use of these new grades, write or call Peter A. Frasse and Co., Inc., 17 Grand St., N. Y. (Walker 5-2200) • 3911 Wissabickon Avenue, Philadelphia (Radcliff 7100-Park 5541) • 50 Exchange St., Buffalo (Washington 2000) • Jersey City, Hartford, Rochester, Syracuse.

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COLD FINISHED BARS
ALLOY STEELS
DRILL ROD
WELDED STEEL TUBING
COLD ROLLED STRIP AND
SHEETS
STAINLESS STEELS

Peter A. Frasse and Co., Inc.
Grand Street at Sixth Avenue, N.Y. C.

Please send me a free copy of your chart Sec. D, No. 2, showing NE "specs" and recommended alternates.

Name

Firm

Address

start to finish for the manufacture of metallic aluminum, nine pounds of raw material is required to make one pound of aluminum from high grade ore. The lower grades of bauxite require more ore and also additional amounts of other materials.

In describing various short cuts to production as well as to construction of new plants, Mr. Jolly said that many decisions had to be made based entirely on getting

into production at the fastest possible time, which meant, he said, that many peacetime policies were sidetracked in favor of more expeditious methods. In one instance, the company decided to locate a metal producing plant in a district where it can be supplied with natural gas at a low price. Fifty gas engines are being installed, each driving a 750-kw. generator, and 18 driving 2250-kw. generators. These are DC generators and

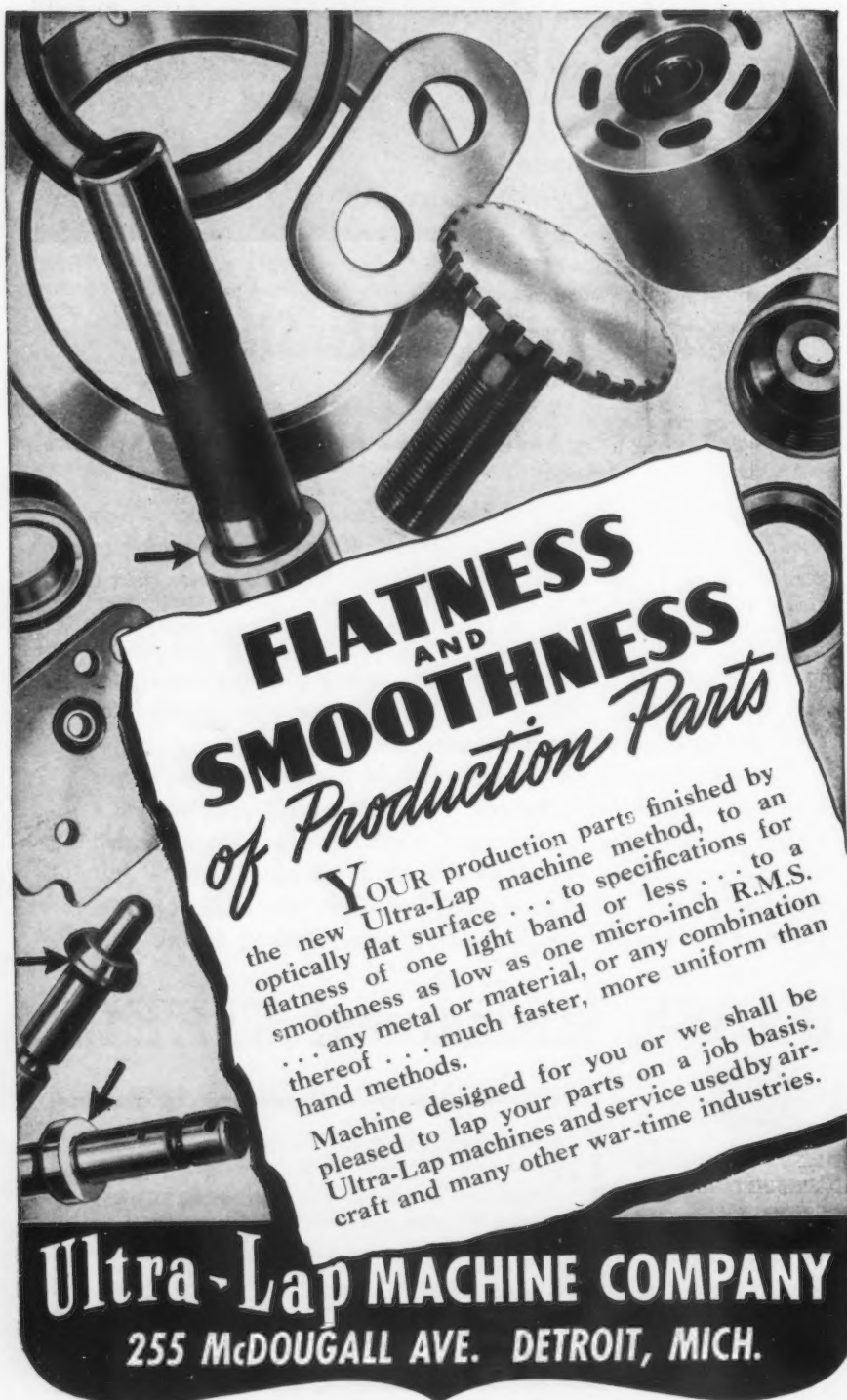
the power is transmitted directly to the production line. This method represents a departure from the conventional procedure of using mercury arc rectifiers, and was adopted because of the time element.

The company found it was cheaper and quicker to expand existing plants and that it would be necessary to standardize buildings and equipment as much as possible. For example, Mr. Jolly said, the company purchased 175 cranes, all of the same span and capacity, from one crane manufacturer. This enabled the manufacturer to set up a production line system and he claimed to have achieved 50 per cent more efficiency.

In another instance the company built 72 buildings from the same shop drawings, thus actually erecting plants by mass production. Mr. Jolly further said that in the new plants a new war type bus bar involving the use of silver is used in order to save copper. Aluminum is using over 14,000 tons of silver for bus bar construction and after the war this will be returned to the U. S. Treasury to be replaced by copper.

YAKS FROM X: The caption of this official Moscow photograph calls these fighter planes "Yaks," and says they are being assembled at "X" factory for delivery to the fighting fronts.

Press Association, Inc. Photo

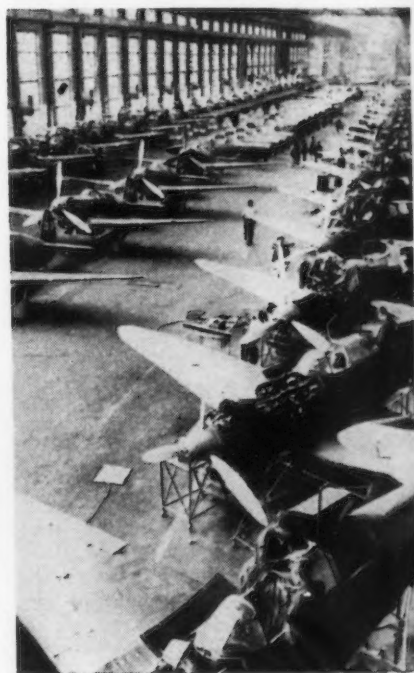


**FLATNESS
AND
SMOOTHNESS
of Production Parts**

YOUR production parts finished by the new Ultra-Lap machine method, to an optically flat surface . . . to specifications for flatness of one light band or less . . . to a smoothness as low as one micro-inch R.M.S. . . . any metal or material, or any combination thereof . . . much faster, more uniform than hand methods.

Machine designed for you or we shall be pleased to lap your parts on a job basis. Ultra-Lap machines and service used by aircraft and many other war-time industries.

Ultra-Lap MACHINE COMPANY
255 McDOUGALL AVE. DETROIT, MICH.



1.6 Million Tons of Steel Allotted to Railroads

Washington

••• With indications pointing to heavier tonnages later if as expected, the steel supply situation improves, the railroads were allotted approximately 1,600,000 tons of steel by WPB last Thursday for deliveries in the first quarter, the first six months, and the first eight months of 1943. Authorizations for the maintenance program, calling for 1,098,000 tons of steel, were for the first quarter. Those for freight cars, totaling 20,000 and requiring about 400,000 tons of steel, were made for the first six months. Those for locomotives, 250 steam and 136 Diesels, requiring approximately 96,500 tons of steel, were made for the first half and the first eight months.

The Association of American Railroads has placed before WPB as a minimum program calling for 80,000 freight cars and 900 locomotives, involving about 1,825,000 tons of steel, exclusive of 2,000,000 tons of rails which railroad executives say will be required. The view is growing that if the

steel situation eases up as some steel executives predict, the railroads will get these requirements. They may do so, it is claimed, by WPB both stepping up allotments already made and allowing heavier allocations for the remainder than heretofore were thought to be probable.

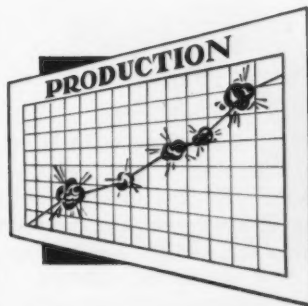
The program authorized last week follows:

	1943 Deliveries
250 steam locomotives.....	First eight months
36 road diesels.....	First eight months
100 switching diesels.....	First six months
20,000 freight cars.....	First six months

Steel for maintenance of equipment and lines, deliveries to be made in the first quarter of 1943:

Repairs to equipment.....	330,000 tons
Rails	480,000 tons
Track accessories	288,000 tons

The program determination by the WPB Requirements Committee was outlined to the Transportation Equipment Advisory Committee by Andrew Stevenson, director of the board's transportation Equipment Division.



VICTORIES

THAT DON'T APPEAR IN OFFICIAL COMMUNIQUEs

Victories are won daily by unsung heroes in the battle for production that goes on incessantly in the metal processing plants across America.

The ceaseless effort to meet the demands for more and more *materiel* is constantly proving the dependability of Roots-Connorsville Blowers and Exhausters. Simple design and rugged construction enable them to "take it" under the most adverse conditions. Their ability to handle increased loads has earned the respect of skilled workmen who admire "guts" equal to their own in sticking with tough jobs.

Our long experience is at your service if we can be helpful in suggesting ways to use your present equipment to better advantage. Any firm which can extend the high priorities required by present regulations should consider future needs now, as war-time demands lengthen deliveries.

ROOTS-CONNORSVILLE BLOWER CORP.
211 Ohio Avenue Connorsville, Indiana



Two Centrifugal Gas Boosters handling blast furnace gas in a Detroit steel mill. Capacity 40,000 CFM each.



PUT YOUR SCRAP INTO THE FIGHT!



Rotary Positive & Centrifugal
AIR and GAS HANDLING EQUIPMENT

TAKE A BATTLE ORDER: Somewhere on Russia's northwestern front, this fighting stenographer takes dictation from a Soviet officer. Notice the tommy gun leaning against her desk.

Acme News Pictures



Canada's External Trade Doubles Peace-Time Figures

Ottawa

... Canada's external trade has reached a record for this year that more than doubles the annual peace-time figures. The sharp gain registered this year is entirely due to Canada's war program, the imports of record tonnages of steel from the United States and exports of finished war materials to the various battlefronts of the world. As Government officials state that this country will reach peak war production in 1943, it is believed that next year will show even greater expansion in external trade.

Trade Minister MacKinnon announced that Canada's export trade for the 10 months ending October 31, amounted to \$1,900,000,000—more than double exports for the 12 months of 1939, and \$250,000,000 greater than the figures for the whole of 1941. He further stated that imports for the same period are nearly double those for the whole of 1939 and

almost equal imports for the 12 months of 1941. Total external trade figures for the first ten months of this year amount to \$3,285,649,284 compared with \$1,636,977,247 for the whole of 1939, and \$3,089,246,191 for the full year 1941.

Canada shows a favorable balance of trade so far this year of almost \$525,000,000. Mr. MacKinnon stated that the figures reflected the extent to which Canadian export trade has developed.

E. P. Taylor of Toronto Given Canadian Position

Ottawa

... C. D. Howe, minister of munitions and supply, has appointed E. P. Taylor of Toronto, as his deputy on the Combined Production and Resources Board. Until last week the Board comprised representatives of the United States and United Kingdom only. With the addition of Canada to the board, Mr. Howe became the official Canadian rep-

resentative, and Mr. Taylor will not act for him. Since it will be necessary for Mr. Taylor to devote the greater part of his time to this new post, he will not be able to assume the duties of president of War Supplies Limited, a government-owned company, as announced Oct. 15.

H. J. Carmichael has resigned as president and Director of War Supplies Limited, which is charged with the responsibility of implementing the Hyde Park agreement, because of the pressure of his duties as co-ordinator of production and chairman of the production board of the Department of Munitions and Supply.

V. H. T. Scully has been appointed director and president of War Supplies Limited, to replace Mr. Carmichael. In addition Mr. Scully will retain his position as treasurer of the company. J. B. Carswell, director general of the Department's Washington office, remains as vice-president and director, and E. J. Brunning, director general, ammunition and gun production branch, a director.

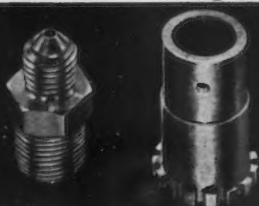


We can thank the 'Old Bull'...

... and the millions of others on our production front for the "miracles" American industry is achieving every day. They are earning to the fullest their share in our ultimate victory. Even more so are the boys on the fighting fronts—and it's up to us to see that there's a real future for them here when they've finished the job over there. By exchanging with each other the knowledge and experience we are gaining every day—by analyzing our post-war problems together and planning for them now—we will be doing our share to give this country economic security and freedom after victory.

(Below) A few of the many thousands of our precision-made parts that help "Keep 'em flying and fighting."

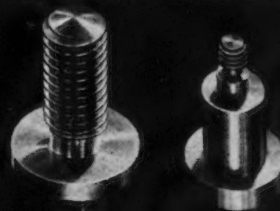
ERICSSON ±
ESTABLISHED 1911



ERICSSON

SCREW MACHINE PRODUCTS CO., INC.

25 LAFAYETTE STREET, BROOKLYN, N. Y.



Canada May Change Its War Production Program

Ottawa

• • • C. D. Howe, Minister of Munitions and Supply, stated that Canada may make a number of important changes in its war production program, following its membership in the Combined Production and Resources Board, as an associate with the United States and United Kingdom. Since the outbreak of war upwards of a billion dollars have been spent in Canada on new plants, plant enlargements and equipment, and this big program of industrial expansion now is nearing the stage of completion. Practically all the nickel used by the Allied Nations is produced in Canada; 40 per cent of all the aluminum produced in North America is from Canada, as well as a very substantial quan-

tity of copper, zinc, lead and other strategic metals, Mr. Howe stated. Further very substantial increases in the production of these metals are scheduled for next year.

Canada's merchant shipbuilding program which involves ultimate output of 300 ships of 10,000-ton deadweight capacity, together with 18 ships of 5000 tons deadweight capacity, is making good progress. Mr. Howe stated that so far this year 60 of the 10,000-ton freighters have been delivered

and merchant shipping tonnage that will be delivered before the end of the year will total 1,000,000 tons, while the program set for 1943 calls for 1,500,000 tons deadweight.

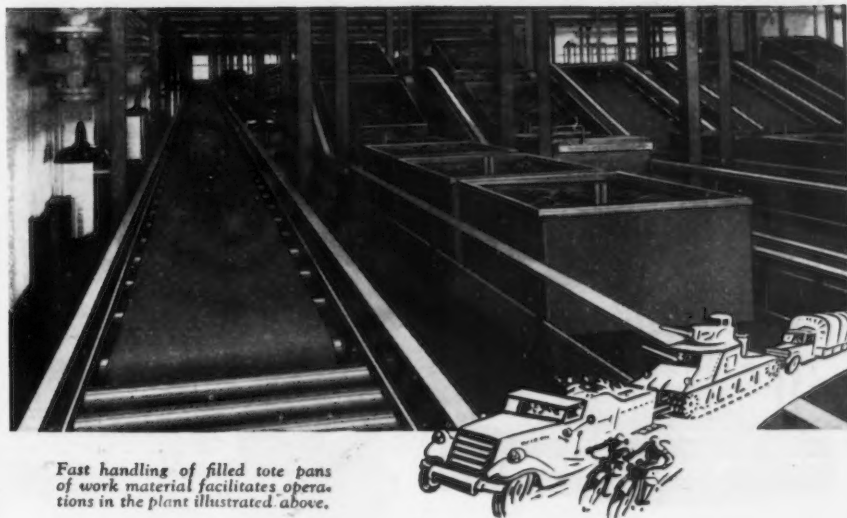
Aircraft production in Canada has been stepped up to a current rate of 5000 planes per year, which compares with 100 a year in 1939. This country is producing nine different makes of planes and is preparing to turn out Curtis dive bombers. Practically all engines

120-HOUR WEEK: Ray Wood, ex-Navy machinist's mate and employee of the Package Machinery Co., Springfield, Mass., proved to be a real production hero by working 120 hours in one week to complete an emergency part needed by the Army. Ray is shown (left) mopping his brow as he is congratulated by company vice-president and treasurer, Roe S. Clark. Wood volunteered to do the job.

Wide World Photo



"Panzer Units..." of the HOME FRONT



Fast handling of filled tote pans of work material facilitates operations in the plant illustrated above.

LONG BEFORE mechanized army movement reached its zenith—American industry perfected mechanized intra-plant movement, via conveyor. Plants equipped for modern material handling are now in a strategically better position. Are you utilizing FLOW principles at all points? At receiving—processing—assembly—shipping? Check your "panzer" possibilities. Write LOGAN CO., Inc., 545 Cabel, Louisville, Ky.

Logan Conveyors

PUT FLOW INTO PRODUCTION

used in Canadian made planes are coming from the United States. War tank production also is an important item in Canada's war effort.

Canada to Cut Farm Equipment Production

Toronto

••• Sharp retraction in farm machinery production in Canada will become effective in 1943,

H. H. Bloom, administrator in the Department of Munitions and Supply, stated. For the coming year farm machinery production will be limited to 25 per cent of 1940 sales. However, in some instances, such as cream separators, production may be continued at 100 per cent of the 1940 figure. Formerly Canada produced 435 types of farm machinery, but under the proposed new quota only 117 varieties will be permitted.

Permaflexor FLOODLIGHTS



MAKE LIGHT DO *More Work!*

When night calls for LIGHT—for production or protection—put Permaflexor Floodlights on the job! Permaflexors—the silvered-glass reflectors with the permanent reflecting surface—use light efficiently, economically, put light where you need and want it. Floodlights available in 4 wattages, 3 light distributions—concentrated, intermediate and broad. Complete, ready to install.

What is your Lighting Problem? Write!

**PITTSBURGH
REFLECTOR CO.**
410 OLIVER BLDG. - PITTSBURGH, PA.



Tear Off

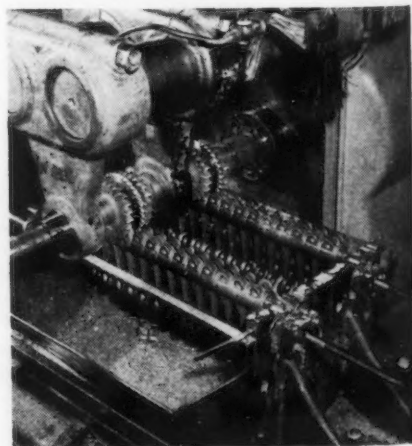
Clip to letterhead
Sign Mail for
complete information,
prices.

Production Ideas

••• American workmen's suggestions and ideas for greater production have been stimulated by a series of awards made by War Production Drive Headquarters. The first ideas to win prizes have been given wide distribution. A synopsis of the second group of prize-winning ideas are listed below in part. War plants interested in examining any of these ideas in greater detail may have a full report by writing to War Produc-



PRODUCTION IDEA: A milling operation which formerly milled only two brake levers at a loading, has now been improved to mill 40 levers at one time, thanks to the ingenuity of Carlton L. Jones, employee of the Yellow Truck & Coach Mfg. Co., Pontiac, Mich. The first photo shows the operation when only two levers could be loaded. The other photo illustrates the special arbor developed by Mr. Jones to accommodate 40 pieces. The idea won Jones a WPB Certificate of Individual Merit and a company award of \$267.20 in War Bonds.



tion Drive Headquarters, Hotel Raleigh, Washington, citing the number.

A method for changing from a milling operation to a hand grinding operation on a shoulder rest piece on the Oerlikon shoulder rest assembly. 251.

Results: Saved 425 man hours per month—released a milling machine and a grinder.

Different method of machining the outside circumference of the top plate of the cylinder by designing a fixture for an engine lathe which eliminated the old method of machining on a vertical mill. 248.

Result: Output increased by 60 per cent from 40 to 65 pieces per shift and a simple turning tool is used without undue breakage. Finish has been greatly improved, manual labor and costs substantially reduced.

A new method to combine two polishing operations on outside of cylinder barrel into one by using two wheels simultaneously with spacer in between. Suggester later developed a double wheel. 244.

Result: Output was increased by 50 per cent from 64 to 96 pieces per shift by new method. Formerly used 12 single wheels per shift, now use three double wheels per shift, due to greater rigidity of double wheel and consequent less wear. Also obtained better finish.

Elimination of two operations on fork and blade rods. Connecting rod is held in special fixture. Operation is milling of bosses on pin end. A hollow mill cutter, descending on piece, mills the outside surface and radius at the bottom of boss. Rod is then turned over and same operation performed on other side. Cutter blades are held in head. 245.

Result: Two machines and four men are eliminated, thus effecting an annual saving of \$14,000 plus the cost of two machines. There is also some saving of time by eliminating second set-up.

New method of lapping diamond pointed tools used for dressing wheels of thread grinders. 170.

Result: On each lapping, the cutting life of the tool is increased 30 per cent of an added cost of 25c. In total 18 cutting edges are secured from a single diamond as against its original two.

Multiple torch arrangement for brazing tool tips to tool shanks. Device uses three torches which play equally on tool tips to give even brazing of carbide tips to tool shank. From the source of supply, the fuel passes through regulators to snap-off valve, then to manifold pipes, escapes through needle valves and then to blowpipes, where it is mixed. It feeds all three torches. 220.

Result: This method replaces that of doing tool tip brazing by hand torch and electric furnace, which caused scale. Production of shells suffered because of tool tips breaking due to poor brazing. New method adopted and proven most successful.

Adjustable pilot for countersink. It is threaded, allowing adjustment for wear. 209.

Result: Adjustable pilot countersink can be used considerably longer than solid countersink.

Power reamer for burring tubing cut on Radiac cut-off machine. Use of a tapered pipe reamer drive by an air motor placed on a stand next to the Radiac cut-off machine to burr inside of tubing and pipe after it

had been cut off. This burring was formerly done on a lathe and each piece had to be chucked separately. 208.

Result: The probable saving per year is 250 man-hours.

Improvement of impeller on Wheelbrator machine by reversing the blasting impeller blades and making a slight change in the deflector plate. 206.

Results: Greatly lengthens the life of the impeller blades and wearing plate.

Use of a portable type vacuum cleaner for cleaning carburizing retorts. 157.

Result: Reduced the time for cleaning from 1½ hr. to 10 or 15 min.

New method of drilling cotter key holes on connecting rods. This method provides for one man to operate two spindles on a four-spindle sensitive drill press by tying handles together with a bar. 255.

Result: It is estimated that this will effect a savings of 4000 man-hours in a year.

An electrode holder for welding, devised by

cutting off jaws of worn out tongs, drilling a hole in rear part which accommodated the electrode. A square fibre was inserted on handle to keep electrode holder from rolling as well as grounding on metal. 216.

Result: Standard tongs usually returned to repair department every three days formerly. New holder prevents this and also adds a safety feature which stopped rolling and grounding.

That standard snap gages be cut in half and mounted so that Go and No Go ends would be side by side. Previously Go and No Go ends were at opposite polls of gage. 187.

Result: Adopted in plant and estimated saving is 0.02 min. each time gage is used.

Method of repairing snap gages. By welding the snap gages with stellite first on one side and then weld on the other side. 258.

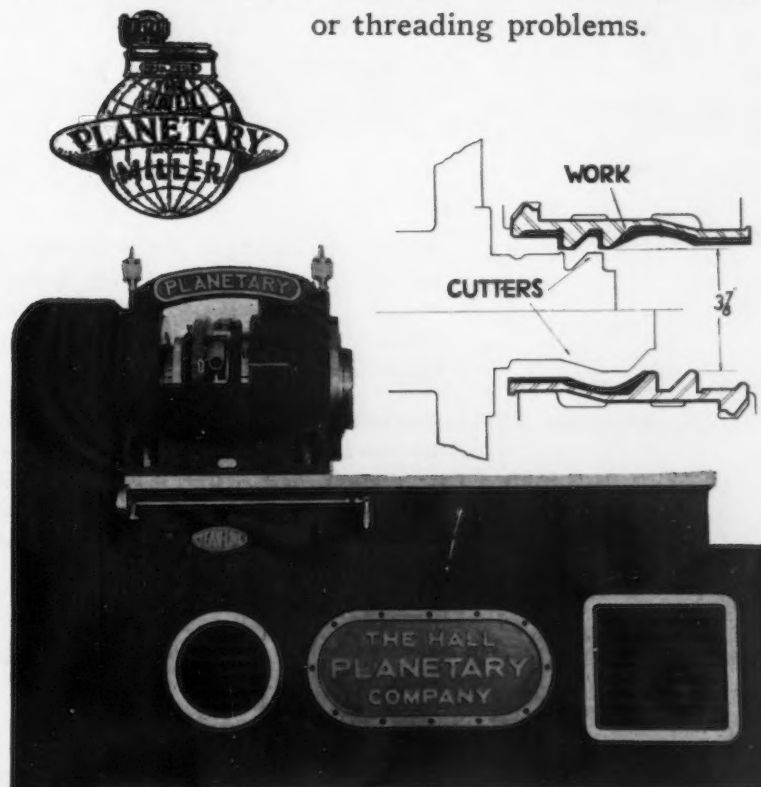
Result: This gives stellite tips on both sides and greatly increases their length of service.

PLANAMILLING

Internal form-milling or Planamilling is performed on this piece in two operations—reversing the work for the second operation.

Each Operation in 10 Minutes

Perfect location of shoulders. Concentricity maintained. Let us help you with your milling or threading problems.



COMING EVENTS

Nov. 20—Galvanizers' Committee, Pittsburgh.

Nov. 24 to 29—National Chemical Exposition, Chicago.

Nov. 30 to Dec. 3—American Society of Mechanical Engineers, annual meeting, Hotel Astor, New York.

Nov. 30 to Dec. 4—National Exposition of Power and Mechanical Engineering, New York.

Nov. 30 to Dec. 4—American Society of Mechanical Engineers, New York.

Dec. 1 and 2—American Society of Refrigerating Engineers, New York.

April 7 to 10, 1943—Electrochemical Society, Pittsburgh.

HALL PLANETARY CO.

FOX & ABBOTSFORD AVE., PHILADELPHIA, PA.

USES Places 286,000 in Pennsylvania Into Jobs

Harrisburg, Pa.

• • • Reporting an additional 16,000 job placements in the last half of October, H. Raymond Mason, United States Employment Service Director for Pennsylvania, announced the number of persons placed in jobs by the agency so far this year is approximately 286,000, which figure is 36 per cent ahead of that for the corresponding period last year.

Commenting on the high placement rate which is being maintained by the manpower agency, Mason reported that "special war production units have been set up in many U. S. Employment offices to concentrate on the labor supply problems of war industries in their area. This is just one of the many moves made by the Employment Service in its continuous effort to improve its performance of vital functions in the war effort," he declared.

Gary Works Sets New Iron Production Record

Chicago

• • • Despite the handicap of having only 11 blast furnaces out of 12 in operation, more iron was produced in the past week at Gary Works of Carnegie-Illinois Steel Corp. than ever before in the history of that plant. The new record of 84,082 tons exceeds by 245 tons the best previous weekly high established in June when all 12 furnaces were operating. The 12th blast furnace is being rebuilt and enlarged.

A new 24-hr. record output of 12,846 tons on Nov. 14 was the decisive factor in accomplishing this feat. The added production during this 24-hr. period assured the establishment of the new weekly mark, and topped by more than 400 tons the old daily high made with the 12th furnace in operation.

Nash-Kelvinator Resumes After 3-Day Labor Dispute

Lansing, Mich.

• • • Production in two plants of the Nash-Kelvinator Corp. resumed Sunday, Nov. 15, after a three-day tie-up due to a labor dispute.

The dispute began when workers ejected a foreman and his assistant. The company subsequently closed the plant. Settlement reached by the War Labor Board and the Air Corps representative provided that the two supervisors would go back to their jobs in charge of mechanical operations but would have nothing to do with personnel relations in the department.

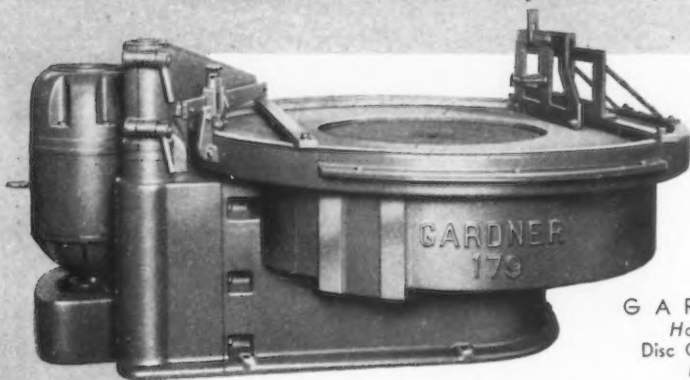
Storm on Lake Superior Hampers Ore Vessels

Sault Ste. Marie, Mich.

• • • The Steamer "Enders M. Voorhees," launched earlier this year at Detroit, made dock last weekend after a bad storm on Lake Superior cracked its seams. The Voorhees is owned by the Pittsburgh Steamship Co.

Many other ore carriers along the lake took shelter as heavy snow and sleet fell in a bad wind and 14 deg. above zero temperature. Two barges loaded with stone received serious damage in the Michigan Northern Canal, near Sault Ste. Marie.

Handles *larger-than-ordinary*
flat surface jobs!



GARDNER
Horizontal
Disc Grinders —
NOW
available
in 84" size!

THE great versatility — the exceptionally wide work-range — of the standard 53" and 72" Gardner Horizontal Disc Grinders, have led to their almost universal adoption for quickly generating flat surfaces on large work.

Now an 84" machine is available — the largest of this type ever built. Carrying a heavy-duty Gardner WIRE-LOK Abrasive Disc, this tool is capable of handling large bases, gun mount parts, or any similar pieces of unusual size requiring a good, flat surface.

If your castings are larger than ordinary — if your present machining costs are running too high — investigate this 84" Gardner Grinder.

Write for descriptive bulletin!



Use Modern
GARDNER
WIRE-LOK
Abrasive
Discs on Your
Disc Grinders!

GARDNER MACHINE COMPANY

412 East Gardner Street

Beloit, Wisconsin, U. S. A.

Warning

••• An impostor, claiming to represent *THE IRON AGE*, is operating in northern Ohio and also possibly in western New York state. A Cleveland manufacturer writes that he paid this man \$20 for a three-year subscription for *THE IRON AGE*. The printed receipt bears the name of "Publishers Service Bureau, 428 Fifth Ave., New York City," a non-existent organization, and is signed "A. Moore."

A Syracuse manufacturer reports that he was visited recently by a man, purporting to be an *IRON AGE* representative, and offering three years' service for \$20. *THE IRON AGE* subscription rate is a straight \$8 a year, \$16 for two years, \$24 for three.

If this individual should call on you will you kindly send a wire collect to *THE IRON AGE*, Reader Service Dept., 100 E. 42nd St., New York.

Detroit Electroplates Hold Annual Session Dec. 5

Detroit

••• The Detroit branch of the American Electroplaters Society will hold its annual educational session and dinner dance at the Hotel Statler, Dec. 5.

An afternoon program has been scheduled with these speakers: Dr. Ralph Lee, General Motors Corp., "Human Engineering"; T. G. Coyle, United Chromium, Inc., "Hard Chrome Plating"; Lt. J. Teres, Wright Field, "Metal Finishing for Military Aircraft"; H. G. Moock, Chrysler Corp., "Imagining."

South Bend Lathe Issues Booklet On Lathe Lubrication

••• The second of a series of lathe service bulletins issued in the interest of more efficient war production has been published by the South Bend Lathe Works, South Bend, Ind. "Oiling the Lathe" emphasizes the importance of proper lathe lubrication in maintaining maximum performance and accuracy. It outlines a regular procedure of oiling with proper lubricants at definite intervals.

This 19-page bulletin, H2, will be helpful to the operator of any size engine lathe, regardless of make. It is available free.

Production Starts At New C-I Duquesne Unit

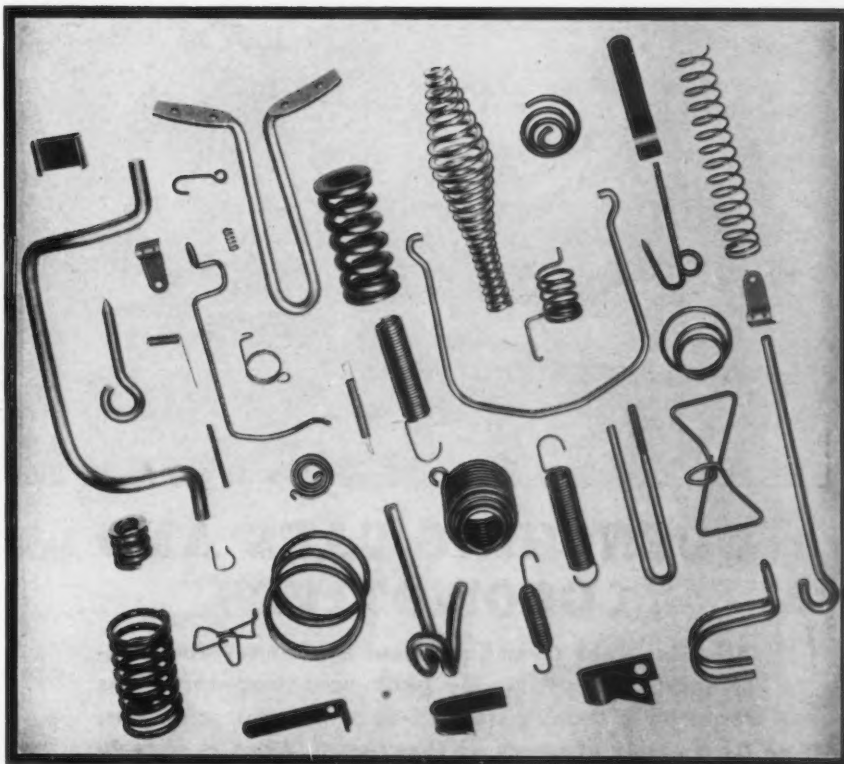
Pittsburgh

••• The first of three new electric furnaces at Carnegie-Illinois Steel Corp.'s Duquesne works began operation on Monday. The new furnace, which has a capacity of 3380 tons a month, is the smallest of a battery of three Defense Plant Corp. units. The two sister furnaces, now under construction

in the same building, will have a combined monthly capacity of 9953 tons.

DPC also is financing new steel conditioning and heat-treating plants at Duquesne to handle the tonnage from the new electric units. These also are expected to be in operation by early spring. Carnegie-Illinois is financing the installation of soaking pits, pre-heating furnaces and auxiliary facilities.

Springs for WAR JOBS!



IF YOU NEED SPRINGS, wire assemblies, wire parts, or small stampings for war equipment, Cuyahoga's wide experience and facilities for applying the flexibility of spring and wire design to defense applications is available for direct war or sub-contractor requirements.

CUYAHOGA SPRING CO.



10280 BEREA ROAD
CLEVELAND, OHIO

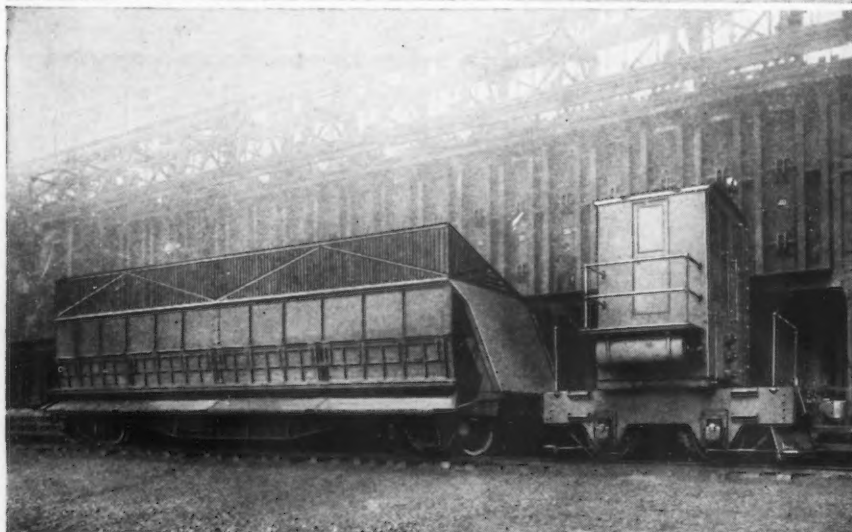
Missouri Pacific to Buy 22 Steam, Diesel Locomotives St. Louis

••• Missouri Pacific Railroad has been authorized by the Federal Court at St. Louis to purchase 15 4-8-4 roller bearing steam freight locomotives to cost approximately \$208,200 each, a total of \$3,123,000, and seven 1000

hp. diesel switching locomotives at \$79,000 each, total of \$553,700, a grand total of \$3,676,700.

In stressing the need for the new equipment, the Court was told that the six months ended Oct. 31 showed a 63.2 per cent increase in gross ton miles, as a result of which it has been necessary to borrow 25 engines from neighboring lines at a rental of \$44,453 a month.

COKE OVEN EQUIPMENT



QUENCHING CARS AND LOCOMOTIVES

All Atlas Coke Oven Equipment is of heavy-duty construction permitting the peak operating conditions required in today's stepped-up production schedules. As a result of years of experience, Atlas is able to design and build equipment, to meet the requirements of each particular coke plant. Detailed information available on request.

Other ATLAS Products

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| Ore Transfer Cars | Locomotives for |
| • | Switching and Interplant |
| Scale Charging Cars | Haulage |
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| Electrically Operated Cars for | Turntables |
| Every Haulage Purpose | |

The ATLAS CAR & MFG. CO.

ENGINEERS

MANUFACTURERS

1100 IVANHOE RD.

CLEVELAND, OHIO, U. S. A.

Pig Iron Futures Improved for Foundries Philadelphia

••• Allocations of pig iron for November reflected a slight improvement over the quantities allocated for the preceding month and a movement in Washington toward a loosening of allocations for a few months to permit the building of larger inventories was hinted.

In November about 60 to 70 per cent of the quantities requested were granted which contrasts with a scant 60 per cent of requirements granted in the preceding month. For December dealers anticipate an even greater loosening of amounts to a possible 80 per cent. This, it is believed, may be the result of numerous requests to Washington asking that slightly larger amounts be allocated for a few months to permit the building of inventories which would permit operation in the following month until allocated tonnages could be shipped by dealers. This suggestion is known to have been receiving favorable attention in the Capital.

Ayres Sees Drastic Cuts In Output of Civilian Goods Cleveland

••• "Producers of civilian goods are going to be drastically restricted," said Brig. Gen. Leonard P. Ayres, vice-president of Cleveland Trust Co., in his latest monthly bank bulletin. "At present, it is proposed to reserve for civilian use only 1.5 per cent of the steel produced next year," and as for other metals, he said that 0.75 per cent of the next year's copper output and almost no aluminum would be allowed for civilian uses.

Wind Blows Wire Down; Steel Works Hampered Youngstown

••• An electric power failure followed by two explosions temporarily hampered the Ohio Works of Carnegie-Illinois Steel Corp. Nov. 12. The explosions, which put four workmen in the hospital from hot metal burns, occurred at the blast furnaces when the water cooling jackets were burned out after the electrically operated pumps stopped and some water came into contact with the molten iron in the furnaces. The power failure was caused by high winds, which blew down a wire.

Easing in Steel Forecast For Next Six Months

Chicago

• • • An easing of the steel supply situation over the next six months was predicted last week by H. K. Howe, manager of the Washington office of La Salle Steel Co., in an address at the Ordnance Day conference of the Purchasing Agents Association of Chicago. This easing, Mr. Howe said, does not apply to alloy steels and possibly large bars which he expects will remain very tight for a long time to come.

Howe told the purchasing agents that they might just as well figure that they will never get steel that is not shipped in the quarter for which it was requested. Under the present PRP and also under the new CMP, mills will not be able to make up delinquent tonnages. This means, he said, that a lot of the mills' backlogs will never be shipped, so that actually the load on the mills is much lighter than their order books would indicate.

This condition, combined with the fact that practically all authorized construction projects are coming to an end and the fact that many war contracts have been cut back and monthly production lowered, indicates a much easier situation in the next six months.



KID SALVAGE

V-242

Drawn for OWI

Muhlenberg Students Start Rail Recovery Project

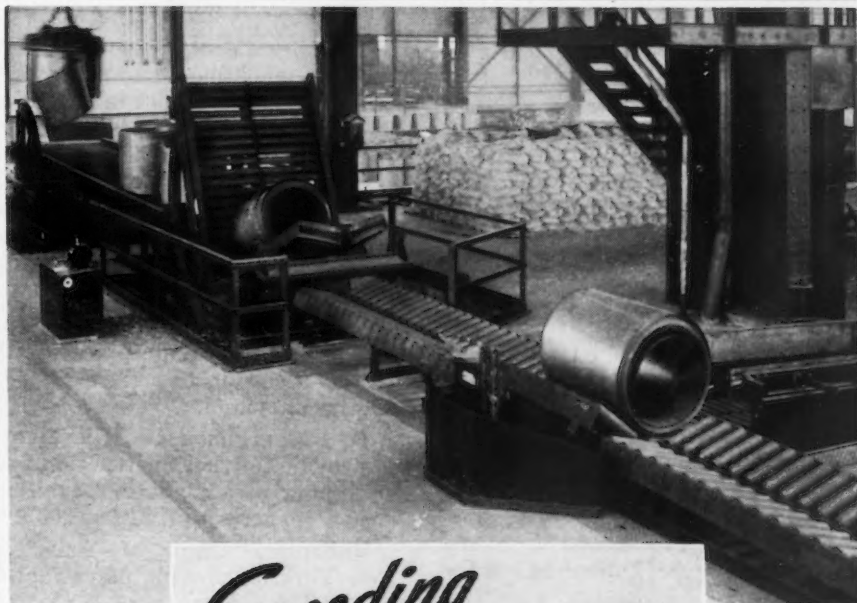
Allentown, Pa.

• • • Nearly 100 students of Muhlenberg College here have set out to remove 1100 ft. of abandoned street car rail which they discovered near the campus. Ignoring the school's football game with Franklin & Marshall, the students borrowed modern track removing equipment from the Lehigh Val-

ley Transit Co. and set to work.

The rail is part of the abandoned Allentown and Reading Traction Co.'s route and was released to the students by the Berks Utilities Co., present owners of the right of way. Proceeds from the rails, which will be sold as scrap to an Allentown war plant, will go to buy war bonds destined to become a scholarship fund for Muhlenberg boys now serving in the Army.

MATHEWS CONVEYERS FOR MECHANIZED HANDLING



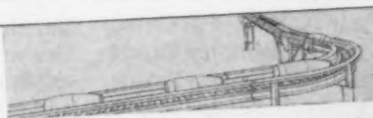
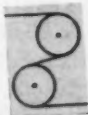
Speeding
THE TOOLS OF
Victory

• TIME WAS NEVER MORE PRECIOUS than in this national emergency. Every step that can be saved . . . every unnecessary motion that can be eliminated . . . every ounce of energy that can be conserved helps to speed the tools of victory.

Keeping munitions, materials, and machinery supplies moving faster and with less worker fatigue is the function of Mathews Conveyor Systems today.

Mathews engineers have helped hundreds of manufacturers of war material speed up production schedules. Perhaps they can help you.

If you are manufacturing war material, or anything vital to the success of the war effort, you can get Mathews Conveyers to handle that material. Rely as usual on your Mathews Engineer.



MATHEWS CONVEYER CO.
Ellwood City, Penna.

Cited for Award

• • • The first "E" award for 18 months of uninterrupted excellent production has been made to the Die and Machine unit of the Fisher Body division of General Motors Corp., Detroit. The unit, which makes 3 and 5 in. gun breech housing mechanisms for the Navy, received its original "E" pennant in the summer of 1941.

The War Department announced last week that the following additional industrial plants have been selected to receive the Army-Navy production "E".

Aerco Corp., Hollydale, Cal.
Aircraft Accessories Corp., Kansas City, Kan.
Aluminum Co. of America, Niagara Falls, N. Y.
Aluminum Ore Co., Aluminum Co. of America, Mobile, Ala.
Atlantic Mfg. Co., Philadelphia.
Bakewell Mfg. Co., Los Angeles, Cal.
Benson Mfg. Co., Kansas City.
Bliley Electric Co., Erie, Pa.
Carolina Aluminum Co., Aluminum Co. of America, Badin, N. C.
Consolidated Aircraft Corp., Plants 1 and 2, San Diego, Cal.
Edwards Co., division of Rogers Diesel & Aircraft Corp., Sanford, N. C.
Emerson Electric Mfg. Co., Turret division, St. Louis county, Mo.
Gaede Dyeing Co., Inc., Paterson, N. J.
Giffillan Brothers, Inc., Los Angeles.
Grimes Mfg. Co., Plant 1, Urbana, Ohio.
Haines Gauge Co., Philadelphia.
Lempeco Products, Inc., Bedford, Ohio.
Middlesex Paper Tube Co., Burlington, N. J.
Peco Mfg. Co., Philadelphia.
Republic Mining & Mfg. Co., Aluminum Co. of America, Bauxite, Ark.
Singer Mfg. Co., Elizabethport, N. J.
Stewart Silk Corp., Easton, Pa.
United Specialties Co., Mitchell Division, Philadelphia.
Zenith Radio Corp., Chicago.

DPC Lets Plant Contracts

• • • Defense Plant Corp. subsidiary of the Reconstruction Finance Corp. has authorized the following contracts:

National Carbon Co., Inc., New York, to provide for plant facilities in North Carolina, at a cost in excess of \$500,000.

Wheeling Bronze Casting Co., Wheeling, W. Va., to provide for construction and equipment of a plant in West Virginia, at a cost in excess of \$375,000.

Micamold Radio Corp., Brooklyn, to provide machinery and equipment in a plant in New York, at a cost in excess of \$250,000.

Electronic Mechanics, Inc., Paterson, N. J., for additional equipment in New Jersey at a cost in

excess of \$140,000, making a total commitment of more than \$240,000.

Bridgeport Brass Co., Bridgeport, Conn., to provide additional equipment in Indiana, at a cost in excess of \$1,000,000, making a total commitment of more than \$18,000,000.

Ford Motor Co., Dearborn, Mich., for additional machinery and equipment in Michigan, at a cost in excess of \$250,000, making a total commitment of more than \$10,250,000.

Dow Chemical Co., Midland, Mich., to provide for the construction and equipment of a plant in Texas, at a cost in excess of \$2,500,000.

Chrysler Corp., Detroit, for additional machinery and equipment in Michigan, at a cost in excess of \$75,000, making a total commitment in excess of \$1,800,000.

H. K. Ferguson Co., Cleveland, to provide for the construction and equipping of a plant in California, at a cost in excess of \$1,500,000.

Maryland Sanitary Mfg. Corp., Baltimore, to provide plant facilities at a cost in excess of \$1,250,000 in Maryland.

H. K. Ferguson Co., Cleveland, to provide for the construction and equipping of a plant in Texas, at a cost in excess of \$1,000,000.

Vanadium Corp. of America, New York, to provide plant facilities in Pennsylvania, at a cost in excess of \$750,000.

Vulcan Detinning Co., Sewaren, N. J., to provide for the construction and equipment of a plant in Pennsylvania, at a cost in excess of \$600,000.

Odenback Shipbuilding Corp., Rochester, N. Y., to provide plant facilities in New York, at a cost in excess of \$400,000.

Erie Register Corp., Erie, Pa., to provide plant facilities in Pennsylvania, at a cost in excess of \$275,000.

Withers Gem and Mining Corp., Atlanta, to provide machinery and equipment in Georgia.

Curtiss-Wright Corp., Pittsburgh, for additional plant facilities in Pennsylvania, at a cost in excess of \$275,000, making a total commitment of more than \$7,750,000.

Wico Electric Co., West Springfield, Mass., to provide for the con-

struction and equipment of a plant in Massachusetts, at a cost in excess of \$175,000.

Kinner Motors, Inc., Glendale, Calif., to provide machines and equipment in a plant in California.

Nash-Kelvinator Corp., Detroit, for additional plant facilities in Wisconsin at a cost in excess of \$900,000, making a total commitment of more than \$32,000,000.

Rohm & Hass Co., Philadelphia, to provide for the construction and equipment of a plant in Pennsylvania, at a cost in excess of \$300,000.

Henry Weis & Co., Elkhart, Ind., to provide machinery and equipment in a plant in Indiana.

Open Heat Treating Capacity Reported in Enameling Plants

Chicago

• • • Several large porcelain enameling plants which have recently converted their enameling furnaces to handling metal heat treating jobs report some difficulty in obtaining work for these units.

Local WPB officials have on several occasions asserted that there was a shortage of heat treating facilities in this area, but have been of little value of obtaining work for these converted facilities.

The open heat treating capacity in these converted enameling plants is largely of a type that can be used for treating large steel castings and similar parts.

WPB Adds 16 Specialists On Machine Tools

• • • In order to strengthen further its field office facilities, the War Production Board today announced the assignment to the office of field operations of 16 industrial specialists on machine tools. These specialists, who will be assigned to regional field offices in areas where their services will be of the most value, will get their directions on the machine tools program from the tools division.

The specialists are equipped to aid manufacturers on anything pertaining to the production of machine tools, small tools, chucks, anti-friction bearings and related articles.

WLB Regional Office Clarifies Wage Rules

••• Clarifying both the amount of authority placed with the regional offices of WLB and Wage and Hour offices and the proper formula to be used for bringing wage increase problems to their attention, were the statements of local acting regional WLB director, Sylvester Garrett at a press conference held here Monday.

Outlining the exact limitations of the WLB Regional Office's authority in deciding the propriety of wage increase applications Mr. Garrett said, "The WLB has jurisdiction over the adjustment of salaries up to \$5,000 a year, except for those employees holding positions of bonafide executive, administrative or professional capacity who are not represented by duly recognized or certified unions."

Mr. Garrett stressed the fact that the purpose of the original directive and of the WLB's authority was not intended to "freeze" salaries but to exercise a control which would offset the spiral of inflation and prevent other maladjustments arising from uncontrolled wage and salary increases. Inequalities of wage scales such as this have been a cause of the extremely troublesome problem of labor migration.

By way of further explanation, Mr. Garrett also pointed out that the present shortage of manpower was one of the reasons requiring wage and salary control. Just as impending shortages of foodstuff and the desire on the part of the public to hoard supplies tended to drive food prices upward so manpower shortage and attempted hoarding of manpower had a similar effect and required the same type of control.

Mode of Operation

The following method was outlined to assist employers in understanding the workings of the Wage and Hour offices and the regional director of the WLB with wage increase applications.

1. The first requisite is that the application must originate from an employer who voluntarily wishes to pay an increased rate, or arise

from a mutual agreement between employer and employees.

2. Such an application is first presented to the nearest Wage and Hour office, of which there are about 100 in various parts of the United States. This office will decide whether the application is one which must be reviewed by the WLB or can be summarily approved.

3. If the Wage and Hour office decides that the application does not need WLB review it is authorized to grant permission for the increase. However, this decision is observed by the WLB regional director later and even though the increase has been granted and has been paid for some time, if in the opinion of the director the application was a borderline case in the letter of the directive, he may order a review by the WLB. During this period you are permitted to continue paying an increased rate until a formal decision is reached. No penalty is implied in such an instance.

4. If, however, the Wage and Hour office decides that the application must have WLB review, in reverse of the employers best belief, the employer may refer the case to the regional director of WLB.

5. The Wage and Hour office in its decision consults the union dealing with the employer to determine whether the increase agreement has the union's sanction. Where it doesn't, the whole application is referred to the Federal Conciliation Board as would any labor dispute. Wherever it does have union approval, the decision is rendered at once subject to the overall approval of the WLB regional director.

6. Regardless of disapprovals up to this stage, there are appeals which may be made. If the Wage and Hour office disapproves the application it may be appealed to the regional director of WLB. Should his decision also be a disapproval or in cases where a broader decision is indicated he may send the application to the tri-partite (public-labor-management) panel for a decision. Even this decision,

if grounds exist, may be appealed to the national WLB.

Also on the employer's side, where the regional director disapproves an application or recommends a smaller increase than asked for, the case may be appealed by the employer within 10 days to the tri-partite panel through the offices of the regional director. Again this decision, if grounds exist, may be appealed to the national board of WLB at Washington.

Regarding Price Increases

In every application the employer is asked whether the increase in wages is expected to be the basis of an appeal to OPA for a price raise to cover the added cost. One of the forms which the employer presents to the Wage and Hour office in the original application is, in this case, forwarded to OPA for separate decision. An OPA objection to WLB approval of an employer's wage increase application which contemplates a price rise automatically throws the whole case into the hands of the office of the Economic Stabilization director for final review and decision.

General Exemptions

Employers hiring eight or fewer employees are not included under the restrictions of the wage stabilization directive and may raise wages generally or individually without consulting the Wage and Hour offices or the WLB except in the instance where an employer owns a number of small units employing less than eight each but aggregating more than eight employees.

Likewise even though the total number of employees is eight or less the above exemption is not valid if the employee's wages, hours, or working conditions have been established on an industry, association, area or similar basis or negotiated by a master or individual contract.

Wage adjustments for individuals are not subject to Wage and Hour or WLB approval if they are incident to application of the terms of an established wage agreement or because of promotion, advances due to apprenticeship, reclassification, merit, increased productivity and similar individual incentive type individual increases.

1000 Strikers Return Pending WLB Review

Cleveland

••• War production at the National Malleable and Steel Casting Co. was resumed on Nov. 23 after a wildcat work stoppage that started Nov. 19 involving more than 1000 (A. F. L.) United Auto Workers' union members. The workers, who had charged a lockout, agreed to go back to work pending a review by the War Labor Board of a recommendation by W. W. Dawson, WLB referee, to the board against a wage increase because of the wage stabilization program.

When the walkout occurred, the company immediately sought assistance from the WLB to help get the men back to work. The union demand for the wage increase, based on a "rise in the cost of living" clause in the contract, has been pending since September. Upon the recommendation by the board referee that the wage increase be denied, the men walked out. In a telegram sent to the chairman of the War Labor Board, the company stated that "Many employees have walked out upon receipt of referee's report . . . unless you take immediate action, serious strike appears certain."

Regional WLB Final on Steel Wages; 28 Others

••• The WLB gave its regional directors full authority this week to make final decisions on wage increase applications coming from the iron and steel industry and 28 other industries based on the "little steel" formula. This authority extends to decisions covering straight time rate increases up to the limit of 15 per cent above the levels prevailing on Jan. 1, 1941.

In the case of these 29 industries the regional director's approval of a request may be considered final but still retains the power of appeal in case of an unsatisfactory decision. Appeal, it is understood, may be requested within 10 days from the local tripartite panel through the offices of the regional director and finally by the national WLB if necessary.

The 29 industries coming under this new ruling are: abrasives, aircraft, automobiles, chemicals and allied products, cotton manufactures, dyeing and finishing textiles, foot-

wear, iron and steel and their products, leather, logging, machinery, meat products, metal mining, nonferrous metals and their products, nonmetallic mining and quarrying, petroleum, coal and natural gas products, petroleum and natural gas production, planing mills, professional and scientific instruments, photographic apparatus and optical goods, railroad equipment, rayon manufactures, refractories products, rubber-products, sawmills, street and suburban railways and buses, surgical, medical and dental instruments, equipment and supplies, tobacco products, woolen and worsted manufactures, work clothing.

WPB Opens Labor Office at Detroit

Detroit

••• A Labor Production Division has been created in the Detroit Regional Office of the War Production Board, under direction of Clarence M. Bolds. Mr. Bolds is on leave of absence to the government from Kelsey Hayes Wheel Co., Detroit. The new division will work closely with both management and employees to reach and maintain top production. The field of conciliation will not be entered but efforts will be made to prevent labor disputes by reconciling divergent points of view.

WLB Regional Director; Tri-Partite Panel Appointed

Philadelphia

••• Announcement has been made by WLB of the appointment of Sylvester Garrett, former Philadelphia lawyer and recent council for WLB, OPA and most recently a principal mediation officer for WLB, as regional director of WLB with headquarters here. Mr. Garrett's duties will now center around operation of the new wage stabilization order as it applies to local industries. Also announced this week was the appointment of a 12-man tripartite appeal panel to serve with Mr. Garrett. The panel is made up on equal membership representing the public, labor and industry.

Members of the panel in this area are:

Representing the Public: Dr. Alexander H. Frey, professor, Uni-

versity of Pennsylvania Law School.

Dr. Thomas E. Larkin, umpire, Anthracite Conciliation Board, Hazleton, Pa.

Robert Johnson, president, Temple University, Philadelphia.

The Rev. Dr. J. J. Sherer, Jr., pastor, First English Evangelical Lutheran Church, Richmond, Va.

Representing Labor: Frank Burch, secretary-treasurer, Philadelphia Central Labor Union (AFL), Philadelphia.

Thomas Gallagher, organization director, International Union of Marine and Shipbuilding Workers of America (CIO), Camden, N. J.

John J. Lorden, organizer, American Federation of Labor, Philadelphia.

James Thomas, district director, United Steelworkers of America (CIO), Homestead, Pa.

Representing Industry: Harry C. Carr, president, First National Bank, Philadelphia.

W. Horace Holcomb, assistant to the executive vice-president, Baldwin Locomotive Works, Philadelphia.

Philip C. Staples, president, Bell Telephone Co. of Pennsylvania, Philadelphia.

John S. Zinnser, president, Sharpe & Dohme, Philadelphia.

Construction below Last Week, Gains 56% over Year Ago

••• Engineering construction volume for the week totals \$100,060,000, an increase of 56 per cent over the corresponding week last year, but 67 per cent below the near-record volume of last week as reported by *Engineering News-Record*. Public construction tops a year ago by 92 per cent as a result of the 146 per cent gain in federal work. It is, however, 68 per cent lower than a week ago, and federal volume is down 69 per cent. Private construction is 60 and 21 per cent lower, respectively, than a year ago and a week ago.

The current week's construction brings 1942 volume to \$8,866,278,000, an increase of 62 per cent over the corresponding 47-week period last year. Private work, \$533,855,000, is 52 per cent below the 1941 period, but public construction climbs 90 per cent due to the 140 per cent gain in federal work.

Numerous Changes Made by OPA In Pricing of New, Used Machines

••• Changes in OPA regulations designed to simplify the calculation of maximum prices for used machines and parts were announced Nov. 21 by OPA.

At the same time, OPA announced several modifications and extensions of provisions governing pricing of new machines, parts, and machinery services.

The changes are incorporated in Amendment No. 54 to Maximum Price Regulation No. 136, and become effective Nov. 25.

They are as follows:

1—Used Machines and Parts. In calculating the price of a used machine or part, the seller now shall first ascertain the maximum price, f.o.b. factory, of the nearest equivalent new machine.

If the used machine is sold "rebuilt and guaranteed," the maximum price for the used machine, f.o.b. the seller's place of business, shall be 85 per cent of the maximum price, f.o.b. factory, of the nearest equivalent new machine.

If the used machine is sold on an "as is" basis, the maximum price for the used machine, f.o.b. the seller's place of business, shall be 55 per cent of the maximum price, f.o.b. factory, of the nearest equivalent new machine.

Previously by interpretation, the maximum price of the used machine or part was based on the delivered price of the new machine in the area of sale.

A clarifying change is made by the amendment in the instances of second-hand machines sold after so little use that there are no worn or missing parts that should be replaced or repaired for satisfactory operation. A machine which is the equivalent of a rebuilt machine, but has not actually been rebuilt, may command the price of 85 per cent of the nearest equivalent new machine or part.

In another change, the amendment modifies previous provisions so that federal, state and local government agencies, which cannot issue guarantees, may sell used machines that are the equivalent of "rebuilt and guaranteed" machines at the prices "rebuilt and guaranteed" machines would command.

Amendment No. 54, in a broadening provision, extends its pricing procedure for second-hand machines and parts to certain other machines and parts, such as electrical wire, cable and cable accessories, and gears, sprockets, and speed reducers, even though such items, when new, are sold under other price regulations than Maximum Price Regulation No. 136.

2—Changes in Formula for New, Special Machines, Parts, Services. Amendment No. 54 provides that in determining maximum prices for machines or parts for which the manufacturer has no published or confidential price list, actual prices can be used for all subcontracted services.

In addition, actual prices may be used for materials such as brick work or fabricated steel required for sales of machines and parts on an installed basis, in

computing prices of equipment sold on an installed basis.

Actual prices, too, may be used for perishable tools, dies, molds, patterns, and workholding devices charged to a job.

3—Coverage. Chemical process machinery in Maximum Price Regulation 136 was listed as "chemical processing machinery." The listing is now changed to chemical process machinery. Also electroplating and hot-dip metal coating equipment is now specifically listed. Maximum prices for such items shall be the highest charged Oct. 1, 1941.

The Regulation also provided the Oct. 1, 1941, base pricing date for "heat exchange equipment and pressure vessels, industrial." The meaning of this designation has now been replaced by the following three classifications: "heat exchange equipment, industrial," "open tanks and vessels," with specified exceptions, and "pressure tanks," also with specified exceptions. The items specifically excluded include those covered by Revised Price Schedule No. 6, Revised Price Schedule No. 49, or Maximum Price Regulation No. 188.

Amendment No. 54 adds to items given an Oct. 1, 1941, base pricing date the classification of "Industrial Power-Operated Devices for Applying Protective Coatings or for the Application of Metals by Spraying Methods."

In another change, maximum prices for automotive anti-friction bearings, chains, sprockets, gaskets and packing are clearly established as those charged March 31, 1942, when sold by a manufacturer, as in the case of other automotive parts.

Where Federal, State, or local taxes are based on the manufacturer's cost of a machine or part, the tax need not be stated separately.

Fluorspar Prices Boosted

••• Price Schedule 126, covering fluorspar, has been admitted and now provides an increase in prices for metallurgical spar, according to OPA announcement Nov. 18. They are effective Nov. 23.

The new base ceiling prices range from \$25 to \$28 per short ton, according to calcium fluoride and silica content, compared with \$23 to \$25 for top-grade fluorspar previously. They are subject to freight adjustments.

At the same time, dollar and cents ceiling prices are established for acid grade fluorspar, except in

the Illinois-Kentucky district. The new prices are based upon a price of \$32 per short ton for material with a minimum calcium fluoride content of 97½ per cent and a maximum silica content of 1½ per cent, but are subject to freight adjustments. The resulting f. o. b. mine prices are in line with the level of maximum prices heretofore established individually for each producer.

The new maximum prices for acid grade ore are not applicable to the Illinois-Kentucky area, where previous ceilings, varying for the producer, remain in effect.

Rules on Wage Increases

••• OPA has ruled that requests for price increases based on wage or salary adjustments requiring approval of the War Labor Board must be presented OPA before the proposed increases in wages or salaries go into effect. The new procedure, outlined in OPA Release No. 1149 issued Nov. 19, cuts across all price regulations and supplements.

Machines Containing Silver

••• OPA ruled Nov. 20 that prices of machines containing silver may be increased 9.625c per fine troy ounce of silver contained in the item.

MRC Mica Prices Set

••• Ceiling prices at which Metals Reserve Co. may sell non-strategic domestic mica were established Nov. 18 by OPA, ranging from 12c. per lb. for punch to \$2 per lb. for sheet.

Boiler and Radiator Prices

••• Price Schedule 272, fixing maximum prices for cast iron coal burning and oil burning boilers and radiators, was announced Nov. 18. The ceilings are at levels about 5 per cent below prevailing prices in the case of boilers and 12 per cent below in the case of radiators, OPA asserted. The new schedule was effective Nov. 23.

The rollback on boiler and radiation prices is based on prices prevailing from Oct. 1 to Oct. 15, 1941.

Maximum prices for radiation are expressed specifically on a dollars and cents basis according to the size and type of radiation unit.

For boilers, maximum prices are established at 95 per cent of manufacturers' price lists of specified dates in January and February, 1942. The regulation requires manufacturers to continue the long-prevalent discounts to jobbers, which are 20 and 5 per cent on boiler sales and 15 and 5 per cent on radiation.

Actual installations are covered by Maximum Price Regulation 251.

Imported Ores

• • • All imported metalliferous ores and concentrates have been excluded from the General Maximum Price Regulation. Domestic and imported blister copper and lead bullion also were excluded. The action was taken in Amendment 36 to the GMPR, effective Nov. 24.

Tungsten Ore Subsidy Up

• • • Metals Reserve Co. has increased its purchase price for domestic tungsten ore and concentrates, effective Nov. 19, to producers qualifying as "eligible producers and new producers" from \$24 to \$30 per short ton unit of tungsten trioxide. This includes all domestic producers whose output was less than 100 short tons of tungsten trioxide in 1941.

The new prices will be effective until Dec. 31, 1943. No boost in prices of tungsten concentrates sold by MRC for the making of ferro-tungsten and carbon reduced metal powder is contemplated.



"He owns the only eraser in the class"

New CMP Plan Explained in Detail at New York Session

• • • Initiative in calling for bills of materials under the new Controlled Materials Plan rests with government claimant agencies, several thousand industrialists were told at a WPB-NAM meeting called to explain CMP in Hotel Roosevelt, New York, on Tuesday.

The gathering, which greatly exceeded capacity of the hotel ballroom, was assured that CMP, based on exact schedules for end products, is a sound plan. Speeches asserted it will result in greater production from less inventory, reduced cross-hauling, balanced schedules, shortening of production cycles, and all-round flexibility of production.

The plan divides itself into two steps and three time-elements.

The principal steps are: (1) Matching the available materials to production authorized and scheduled; and (2) directing materials to the right place at the right time in the proper quantities.

The three time-elements are: (1) The information period; (2) the application period; and (3) the allotment period.

It was pointed out that most war products are similar to products of line production manufacturers making repetitive products like automobiles. These are the class A products. Class B manufacturers are those making a wide variety of products, like bolts, nuts, roller bearings or small electric motors. Makers of class A products will include in bills of materials information as to the quality of class B products required.

Prime consumers of class A products will make application to their agencies. If the prime consumer is making an A product which is a civilian item like a locomotive, he will still deal with the proper industrial branch in WPB.

A producer of a class A product which is part of a class B product, will make his application to the B product producer. Each B producer, whether his product is an end product or a part, will apply for controlled materials to the appropriate industrial division. Warehouses are considered as suppliers, it was said.

Order L-154 Amended

Washington

• • • WPB last Saturday prohib-

ited the use of copper, copper base alloys or alloys containing nickel, chrome or tin in tubing or tube sheets for feed water heaters by an amendment to Order L-154. Seamless steel tubing is also prohibited.

Excepted from the order are materials needed for the repair of an actual breakdown, involving replacement of not more than 25 per cent of the tubing in a feed water heater.

Petroleum Coke Action

• • • An amended version of Conservation Order M-212, effective Nov. 21, covering petroleum coke, requires that all exports shall have the specific approval of the WPB. Applications for export will be required to set forth the end use to which the petroleum coke is put in the foreign country.

L-123 Amended

• • • Issued on Monday by WPB, an amendment to L-123 effective Dec. 8, requires that purchase orders for necessary repair and maintenance parts for many items of general industrial equipment be accompanied by a certificate, reciting the nature of the purchase. The amended order also clarifies some of the definitions of specific items of equipment. It further adds to the list a number of items, among them safety switches, industrial dust collectors, circuit breakers, magnets, motor generator sets and certain other items related to motor and control equipment which were affected by limitations imposed by the original order.

Steel Wire Violator

• • • WPB on Tuesday issued suspension orders against the Colden Mfg. Co. for an alleged violation of the provisions of Order L-49. WPB claimed that the company used 3 tons of steel wire in excess of permitted quantities in the manufacture of spring mattresses. A 90-day denial of priority assistance is contained in the order.

Aluminum Order Eased To Aid Makers of Steel

Washington

••• Amendment of the Aluminum Conservation Order to permit the use of a limited amount of aluminum as a deoxidizer for making steel for cartridge cases and boxes was announced last Friday by the WPB Director General for Operations. Amendment No. 1 to Supplementary Order M-1-i permits the use of a maximum of 4 lb. of aluminum per ton of steel for this purpose. This use of aluminum (all low grade) will aid in the conservation of a large amount of cartridge brass.

The amendment also:

1. Limits the use of aluminum for deoxidizing steel for castings to 2.5 lb. per ton of metal charged into the furnace. Previously, this limitation was 2.5 lb. per ton of finished steel castings.

2. Removes the provision restricting the use of aluminum in zinc base alloy to 2 per cent by weight. This will permit production of zinc alloy of the higher quality.

L-192 Dates Changed

Washington

••• Dates have been changed for various actions required by Order L-192, which places all construction machinery and equipment under allocation control. The changes in dates, made by Amendment No. 1 last Thursday, were due to delay in issuance of the order. Among the changes were the following:

Date of supersession of L-82-a by L-192, is changed from 15 days after dates of issuance of L-192 (Nov. 7) to Nov. 30, 1942.

Date beyond which production of any equipment designed for or requiring rubber tires must cease unless authorized on Form PD-556, changed from Nov. 15 to Nov. 30.

Date within which proposed production schedule of new equipment may be filed on Form PD-697, changed from Nov. 15 to Nov. 25. This date applies only to filing for the first month under L-192. Schedules for all months thereafter shall be filed on the 15th of each succeeding month.

Date prohibiting the processing or assembling of any material in the manufacture of any equipment listed in Schedule C of L-192, changed from Nov. 15 to Nov. 30.

Date for filing of finished unsold inventory on Form PD-697, changed from Nov. 15 to Nov. 25. This date applies only to filing inventory reports for the first month under Order L-192.

Date controlling the use or transfer of any new equipment covered by L-192, changed from Nov. 15 to Nov. 30.

Date for filing of proposed delivery schedule of all unfilled orders of new equipment on Form PD-697, changed from Nov. 15 to Nov. 25.

Date on which equipment authorized for delivery and listed in Schedule A of L-192, must be used on the project described in the authorization, changed from Nov. 7 to Nov. 30.

Amendment No. 1 to L-192 also corrects certain typographical errors on the original printed order.

Trailer and Truck Orders

Washington

••• Production of all sizes of truck trailers was stopped and the time within which a specified number of heavy trucks may be produced was extended by amendments to two orders issued last Thursday by the WPB Director General for Operations. Amendment No. 2 to Supplementary Order L-1-g redefines the class of truck trailers prohibited by deleting from the definition in the original order the phrase, "having a load-carrying capacity of 10,000 lb. or more." The effect of this omission is to prohibit the manufacture of truck trailers of all sizes.

Amendment No. 1 to Supplementary Order L-1-h extends the time (originally Aug. 1 to Dec. 31) within which the 4000 heavy trucks authorized under the order may be produced to the period Aug. 1, 1942, to March 31, 1943. It does not increase the number of heavy trucks authorized for manufacture.

Changes in Imports Order

••• Several additions to and shifts in the lists of materials covered by the General Imports Order, M-63, became effective Nov. 23 under the terms of Amendment 8. Coir fiber, coir yarn, and coir manufactures have been added to List I. Castor oil, glycerine and metallic mineral substances in crude form and not otherwise classified are moved from List I to List II of the order which does not require special authorization to process or move the commodities.

Alloy Steel Banned

Washington

••• Order L-217, issued on Nov. 17, put an immediate ban on the use of alloy steel in the manufacture of road scrapers, other than those listed on production schedules approved by the Director General for Operations. For scrapers included in the approved list alloy steel may be used only until Dec. 15. After that date no alloy steel may be used in scrapers

or repair parts, except for the production of power control units, prime movers, and anti-friction bearing.

Brass, Copper Mills Warned

Washington

••• Brass mills, copper wire mills, and copper foundries were cautioned recently that they must continue to use end-use classification symbols which are set up under Priorities Regulation No. 10.

Ice Refrigerator Program

••• In addition to establishing an ice refrigerator program for next year Order L-7-c, recently issued, lists production quotas for each manufacturer covering the two months ending Dec. 31 of this year.

For the period ending with that date the order establishes quotas for existing producers. In general, these quotas are equal to 63 per cent of each manufacturer's average annual production in either the one or two-year period ending June 31, 1941.

Until Dec. 31, a total of 107,300 ice boxes is permitted. Manufacturers assigned quotas for this period are limited to a maximum iron and steel consumption of 15 lb. per refrigerator after Nov. 24. Beginning Jan. 1, 1943, a maximum of six lb. of iron and steel per refrigerator is established by the order. The order supersedes Orders L-7, L-7-a and L-7-b which will be revoked on Nov. 24.

Utensils Curtailed

Washington

••• Well over 800 different firms, WPB estimates, were affected by its order of last week, L-30-d, calling for the elimination on Nov. 23 of practically all types of household metal utensils and other equipment not curtailed by three previous actions. The latest order also imposed restrictions on the manufacture and design of utensils and equipment still permitted. Generally, WPB said, items using less than 5 per cent of metal by weight are not affected. The order covers kitchen tools, including items ranging from can openers to egg beaters, glass or

ceramic flameware, cooking utensils and storage utensils such as vegetable bins, canisters and the like.

Exempted from provisions of the order are articles which had been cut, blanked or otherwise formed to size on Nov. 17. However, such articles must be completed by Dec. 31, except for application of the final coating or finish and attachment of handles, pails or cans.

Rating on Stainless Raised

Washington

••• An amendment of Order M-21-d to permit delivery of corrosion or heat resistant chrome steel only on a preference rating of AA-5 or higher, and use of such material only if acquired on a preference rating of AA-5 or higher, was announced last week by WPB. Previously the order permitted the delivery of chrome steel on preference ratings of A-1-k or higher. The amended order makes an exception for the use

and delivery of chrome steel when acquired before Nov. 18 on a preference rating of A-1-k or higher.

Scrap Order Corrected

Washington

••• WPB on Nov. 18 said that the Iron and Steel Scrap Order, as amended Oct. 13, erroneously required filing of Form PD-149A. Correction was made by an amendment to Order M-24.

Gold Mine Machinery

Washington

••• An amendment to Order L-208, issued last week, froze in the hands of their owners, machinery and equipment which had been used in inoperative gold mines. It prohibits the sale or disposal of any machinery or equipment of the types listed in Schedule A of Preference Rating Order P-56, from a non-essential mine as defined in L-208, without specific permission.

Owners of Idle Stocks Must Report Their Sales

••• Owners of idle stocks of copper and steel, and their alloys, who sell directly to authorized war producers, as permitted by Priorities Regulation No. 13, are now required to report such sales by an amendment to that regulation.

When a sale is made of copper from inventories previously reported to the War Production Board, care Copper Recovery Corp., 200 Madison Avenue, New York, the seller must now send a copy of the invoice to that address.

Sellers of steel from reported inventories should address their invoice copies to WPB, care Steel Recovery Corp., 5835 Baum Boulevard, Pittsburgh.

PRP Revised Again; Rule on Excess Eased

Washington

••• WPB on Nov. 18 eased the restriction imposed by Priorities Regulation No. 11 requiring that orders in excess of amounts certified on returned PRP be cancelled. If deliveries of any materials in the forms specified on the PRP Metals List were scheduled before Nov. 21, orders need not be cancelled if the supplier certifies in writing that (a) the material cannot be diverted to fill other orders, or (b) the material has been completed or that cancellation would cause substantially diminished production by disrupting schedules. With this exception, PRP units are required upon receipt of their certificates to cancel or defer orders which would exceed the amounts they are authorized to receive.

Other limitation relaxing changes in Priorities Regulation No. 11 made by amendment are:

The period of time within which a PRP unit must cancel or postpone its purchase orders, so that the ratings and quantities do not exceed authorization on its PRP certificates, is extended to seven days, including Sundays, after receipt of the particular certificate, instead of five working days:

A PRP unit may accept delivery of material in excess of its authorization, if the materials were in transit when the supplier received notice of cancellation or postponement, provided such notice was received by the supplier not later than 10 days after receipt of the unit's certificate:

A PRP unit may accept delivery of materials other than, or in excess of, those authorized on its PRP certificate to the extent that it is entitled to extend AAA ratings:

A PRP unit which filed an application for ratings for materials to be used dur-



"How about a date tonight, Babe?"

ing the second quarter of 1943 on Section H of the first quarter PD-25A application, may now employ the interim procedure with regard to such material, pending the return of its PD-25A for the first quarter;

Any PRP unit which receives during a quarter any listed material other than, or in excess of, the quantities authorized by its PRP certificates, or by specific authorization of WPB, must report promptly such receipts to WPB, together with a statement of the reasons why such receipts were necessary, and citing the provisions in Regulation 11 which permit such receipts;

A revision of Paragraph (k) of Regulation 11 makes it clear that, although a PRP unit failed to file a PD-25A application on the date specified, it may, as soon as it has filed such application, apply ratings to its purchase orders.

The amendment also revises the Metals List of Regulation 11 so as to include only those items appearing in Materials List No. 1, revised, of the PD-25A application form for the first quarter of 1943, and specifically excludes insect wire screen cloth from the forms of metal on the metals list.

M-9-c-4 Amended

Washington

••• Restrictions on the use of copper and copper base alloy building materials have been clarified by Amendment No. 1 to Conservation Order M-9-c-4. The amendment, WPB pointed out, is simply a revision of the definition of the phrase "To install in or connect to a structure or system" to restore the original intention of the order and to correct an inadvertent omission of several words which was made in the amended order of Oct. 27.

Action on Chemicals

••• The WPB Chemical Branch has ordered the use of PD-600 and PD-601 by persons delivering or accepting deliveries of butyl alcohol and ketone. Two allocation orders, M-169 and M-159, were amended Nov. 16 to provide for the use of the forms.

Electric Lamp Order

••• Makers of electric lamps are prohibited from etching a trade mark or other identification on lamps for anyone but themselves or other makers, in Interpretation No. 1 to Order L-28-a, issued Nov. 16.

Order M-126 Relaxed

••• Amendment of Conservation Order M-126 to permit the use of iron and steel to make, repair and maintain parts for certain textile

machinery, plumbing and heating equipment and gutters and spouting for small dwellings was announced Nov. 21.

The amendment (No. 1 to the order as amended Nov. 15) also makes changes in the governing dates of four items which had been controlled since Oct. 2 but which were included as new items Nov. 5. These items are milk bottle caps, toy banks, buckles and outdoor grilles. Other changes:

1. Exemption of roller mechanisms for window shades.
2. Removal of finger nail files, covered by L-140.
3. Removal of autographic registers and certain office machinery, covered by L-54-c.

Ruttenberg Appointed WPB Labor Assistant

Washington

••• Harold J. Ruttenberg was appointed on Tuesday as a labor assistant to the director of the WPB Steel Division. Mr. Ruttenberg has been research director for CIO-USW and will advise on steel labor problems and will also serve as a member of the Production Directive Committee of the Steel Division. This committee directs the product distribution and output of all steel producers and Mr. Ruttenberg will aid in assuring the best possible use of the manpower of the industry in the interests of the war effort.

The announcement of Mr. Ruttenberg's appointment was made in accordance with the program for more effective cooperation between labor and WPB which has been developed by WPB vice chairman Ferdinand Eberstadt together with Ernest Kanzler, WPB director general for operations, and Wendell Lund, Labor Production Division director.

"Mr. Ruttenberg is so well-informed on iron and steel industry problems affecting labor that I welcome his acceptance of the position as an assistant to me in the division," said H. G. Batcheller, chief, Iron and Steel Branch Division director. "His active participation in the development of our program should prove a stimulus to the accomplishment of our new responsibilities under the Controlled Materials Plan."

Quota Exceeding Penalized by WPB

Washington

••• Harry G. Fingerote, Philadelphia, steel warehouse operator, doing business as the Chrome Iron & Steel Co., was penalized by WPB last Saturday for the alleged acceptance of deliveries of plate ends and rejects "substantially in excess of his established quotas for the second and third quarters of this year."

By Order S-144 the Chrome Iron & Steel Co. was denied the right to accept deliveries of any of the steel products listed on Schedule A of Order M-21-b during the first quarter of 1943. During the second quarter of the coming year, deliveries of Schedule A products may not exceed 50 per cent of the warehouse quota established for the company by WPB. Mills and other warehouses are bound by the terms of the order.

At the same time Order S-145 was issued suspending operations of Mr. and Mrs. Alex R. Tigerman, Chicago coin-operated amusement machine manufacturers, doing business as Aero-Craft Co. The orders say that (1) the Tigmans entered into the business of manufacturing amusement machines at a time when Orders L-21 and L-21-a prohibited them from doing so, (2) production of these machines was continued after manufacture was prohibited, and (3) that in the manufacture of these machines they used copper and copper products, a further violation of L-21-a.

Petroleum Coke Tightened

Washington

••• WPB has prohibited the export of petroleum coke without the written authorization of the director general for operations. This coke is important in the aluminum program, WPB said, and it wants to prevent its use for unessential purposes in foreign countries.

WPB's action was taken by issuance of an amended version of Conservation Order M-212, effective Nov. 21. Persons seeking authorization to make export deliveries must inform the Aluminum-Magnesium Division by letter of all details of the proposed export, including the use to which

This Week's Priorities and Prices

Owners of idle stocks of copper and steel, and their alloys, who sell directly to authorized war producers, as permitted by Priorities Regulation No. 13, are now required to report such sales under Amendment No. 1 to Schedule A issued Nov. 17. (T-1225)

Corrosion or heat resistant chrome steel deliveries are restricted to a preference rating of AA-5 or higher and use of such material is permitted only if acquired on such a preference rating under an amendment to Order M-21-d issue Nov. 18. (T-1230)

Cast iron coal-burning and oil-burning boiler and radiator prices are fixed through Maximum Price Regulation No. 272, effective Nov. 23. (OPA-T-311)

Brass mills, copper wire mills and copper foundries have been cautioned that they must continue to use end-use classification symbols which were set up under Priorities Regulation No. 10. (T-1207)

Metallurgical fluorspar maximum prices have been increased by amended Maximum Price Regulation No. 126, effective Nov. 23. (OPA-T-312)

Use of alloy steel in the production or assembly of scrapers or repair parts, except for use in power control units, prime movers and anti-friction bearings, has been sharply restricted by Order L-216, effective Dec. 15. (T-1217)

Maximum prices at which Metals Reserve Co. may sell non-strategic domestic mica were established in

Order No. 141 under Section 3 (b) of the General Maximum Price Regulation. (OPA-T-315)

Imported metalliferous ores and concentrates, domestic and imported blister copper and lead bullion are excluded from the General Maximum Price Regulation through Amendment No. 36, effective Nov. 24. (OPA-1139)

Gold mine operators, whose mines have been closed, must file itemized inventory statements concerning machinery and equipment on hand under amended order L-208. (T-1229)

Metals Reserve Co. has increased its purchase price for tungsten ores and concentrates in order to stimulate further domestic production of tungsten trioxide. (RFC-1697)

Maximum prices of machines and parts containing silver may be increased 9.625c. per fine troy oz. of silver contained in the item through Amendment No. 53 to Maximum Price Regulation No. 136 as amended, effective Nov. 25. (OPA-T-323)

■ ■ ■

For copies of above announcements address Office of War Information, Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB-600 means announcement 600 issued by the War Production Board.)

Revisions to The Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in **THE IRON AGE**, should be added to **THE IRON AGE Priorities Guide** published with the issue of October 8 to bring the Guide up to date.

"Priorities Regulations":

No. 11...Amendment No. 2 (11-18-42) revises order so that its operation will conform during the first quarter of 1943 with CMP; controls over producers are also tightened.

No. 13...Amendment No. 1 to Schedule A (11-17-42) requires owners of idle stocks of copper and steel who sell directly to authorized war producers to report such sales.

"M" Orders:

M-1-i...Amendment No. 1 (11-20-42) permits use of a limited amount of aluminum as deoxidizer for making steel for cart-ridge cases and boxes.

M-8-a...Amendment No. 3 (11-17-42) controls deliveries of cork disks for bottle caps.

M-9-c-i...Amendment No. 1 (11-18-42) clarifies restrictions on the use of copper and copper base alloy building materials.

M-21-d...Amendment (11-18-42) states that permission to deliver corrosion or heat resistant chrome steel is restricted to a preference rating of AA-5 or higher and use of such material is permitted only if acquired on such a preference rating.

M-24...Amendment No. 1 (11-18-42) states that form PD-149A is not required to be filed, as previously stated in amended order.

M-63...Amendment No. 8 (11-20-42) makes several additions to and shifts in the lists of materials covered by the order.

M-68-c...Amendment No. 3 (11-17-42) permits installation of used gasoline dispensing pumps and storage tanks on farms of ten or more acres.

M-126...Amendment No. 1 to amended order (11-21-42) permits use of iron and steel to manufacture repair and maintenance parts for certain textile machinery, plumbing and heating equipment.

M-159...Amended order provides for use of standard chemical allocation Form PD-600 and PD-601. (11-16-42)

M-169...Amended order provides for use of standard chemical allocation Form PD-600 and PD-601. (11-16-42)

M-216...Amendment No. 1 (11-19-42) permits outdoor storage of trailers under certain conditions.

"L" Orders:

L-1-c...Amendment No. 3 (11-17-42) extends time within which

certain off-the-highway motor vehicles may be manufactured.

L-1-g...Amendment No. 2 (11-19-42) prohibits production of all sizes of truck trailers.

L-1-h...Amendment No. 1 (11-19-42) extends time within which a specified number of heavy trucks may be produced.

L-7...Revoked (11-14-42).

L-7-a...Revoked (11-14-42).

L-7-b...Revoked (11-14-42).

L-18-c...Amended order releases for sale new vacuum cleaners frozen in hands of retailers and wholesale distributors since Oct. 24 (11-21-42).

L-28-a...Interpretation No. 1 (11-16-42) prohibits manufacturers of incandescent, fluorescent or glow discharge lamps from etching a trade mark or other identification on lamps for anyone but themselves or other manufacturers.

L-30...Revoked (11-10-42).

L-30-d...Order reduces kitchen gadgets to bare essentials (11-17-42).

L-92...Amended order prohibits use of metal, plastics or cork for repairing non-commercial fishing tackle or for production of repair parts for such tackle (11-18-42).

L-154...Schedule III (11-21-42) restricts use of non-ferrous metals in feed water heaters.

L-187...Amendment No. 1 (11-16-42) postpones until Dec. 1 the cut-off date on production of low pressure cast iron boilers using exclusively gas or oil for fuel.

L-192...Amendment No. 1 (11-19-42) changes dates set for various actions required by order.

L-208...Amended order requires that within the next 60 days operators of closed gold mines shall file an itemized list of machinery and equipment which is on hand (11-18-42).

L-217...Schedule No. 1 (11-17-42) provides for application of conservation and simplification measures to various types of construction machinery and equipment.

L-230...Order prohibits sale, transfer or delivery of all military arms, operating or non-operating, except under certain conditions (11-18-42).

"E" Orders (Correction):

E-1-b...Amendment No. 3 (11-6-42) instructs machine tool makers to give special emphasis to aircraft requirements. Gives new directions for scheduling machine tool deliveries for Armed services. (Erroneously interpreted in this column Nov. 12.)

the petroleum coke is to be put.

This amendment has the effect of nullifying the applicability of Priorities Regulation No. 15 to the export of petroleum coke. This regulation provided that all exports be released from end-use restrictions of WPB orders, unless the material is under complete allocation.

Rail Sales Controlled

Washington

• • • Sales of scrap and rerolling rail in excess of 10 tons a month must be authorized by the Transportation Equipment Division or the Scrap Unit of the WPB Steel Division, this division said on Tuesday. This is required by

Order L-88. Several instances of shipments without permission have been reported. Communications sent to WPB for authority to sell should be addressed to the respective divisions, ref.—L-88. Rerolled or scrap grade is handled by the Steel Division and relayer grade by the Transportation Equipment Division.

PERSONALS

• **Dr. Walter R. Meyer** has joined the Enthone Co., New Haven, Conn., as technical director. He will direct the development of new products and processes for the metal finishing industry as well as to assist in problems attendant with the application of the company's products in the finishing of war goods. Dr. Meyer received his B.S. in chemistry, from Sheffield Scientific School of Yale University, in 1928, and his Ph.D. in 1938 from the Department of Metallurgy, School of Engineering of Yale University. From 1929 to 1931 he was plant chemist of Sargent & Co., New Haven, and from 1931 to 1938, he was electro-chemist and metallurgist of the General Electric Co., Bridgeport, Conn. For the past four years he was editor of *Metal Finishing* magazine and editor of four editions of "Plating and Finishing Guidebook."

• **A. G. Bishop**, roll engineer, has retired after 43 years with Republic Steel Corp. and its predecessor company, Republic Iron & Steel Co. Mr. Bishop joined Republic Iron & Steel in 1899, just three months after its organization. He started as a roll designer. In 1932 he became assistant to Carl Meyers, now Republic's district manager in the Canton-Mas-

sillon district, who was then roll engineer, and in 1935 went to Massillon with Mr. Meyers. Four years later he moved to Cleveland and remained in the Cleveland offices until his retirement.

• **Dr. O. A. Nelson**, former research chemist with the United States Department of Agriculture,



DR. WALTER R. MEYER, technical director, Enthone Co., New Haven, Conn.

has been appointed to the technical staff of Battelle Memorial Institute, Columbus, Ohio.

• **James E. Vosburgh**, associated with Glenn-Roberts Co., Oakland, Cal., since its inception, will head the staff as general manager of the new Indianapolis branch. **Roy E. Davis**, until recently superintendent at the Glenn-Roberts Co.'s Oakland factory, has been appointed assistant manager at Indianapolis.

• **William F. Lahl**, research engineer in the Engineering & Research division of Crane Co., Chicago, will be consultant in the valve and fitting section of the Shipbuilding Division of the War Production Board.

• **Bruce Gregory**, in charge of sales of Thornton Tandem Co., Detroit, has been made vice-president in charge of sales and a member of the board of directors.

• **J. E. von Maur** has been named representative throughout Ohio for the American Gas Furnace Co., Elizabeth, N. J., with offices at 63 South High Street, Columbus, and at 715 Prospect Street, Cleveland.

• **George B. Wadlow**, for more than 25 years connected with the Continental Roll & Steel Foundry Co., East Chicago, Indiana, in purchasing, production and sales capacities, has been made assistant to the president of the Continental Ordnance Corp., a subsidiary.

• **Angus G. Scott** has recently been appointed sales manager of the Derry, Pa., porcelain department of the Westinghouse Electric & Mfg. Co.

• **Harry E. Orr** has been made assistant to the vice-president in charge of operations, Vanadium Corp. of America, New York. **Bert C. Brand** has been named comptroller and **Lawrence C. Miller**, assistant treasurer.

• **Harry Crump**, veteran 26-year employee with General Electric Co., has joined Carboloy Co., Inc., as assistant sales manager to K. R. Beardslee. Since 1929 Mr. Crump has been development engineer on carbide tool applications and development at the central works laboratory in Schenectady.



A. G. BISHOP, who has retired as roll engineer of Republic Steel.



HARRY CRUMP, assistant sales manager, Carboloy Co., Inc., Detroit.

• **H. L. Harvill**, a pioneer in the field of aircraft die castings, has announced his re-entrance in this field as head of his own organization, the H. L. Harvill Co., Los Angeles. Associated with Mr. Harvill is a group of executives with broad experience in the various phases of the industry's operations including **R. C. Beck**, chief engineer; **Adolph Oswald**, permanent mold design; **S. I. Gleason**, metallurgist; **Dale Norton**, casting foreman; **L. W. Johnson**, office manager, and **M. C. Goodfellow**, purchasing.

• **John Howe Hall** has joined the General Steel Castings Corp., Eddystone, Pa., as a metallurgist. For the past five years he has been a foundry consultant, and before that was technical assistant to the president of the Taylor-Wharton Iron & Steel Co.

• **Chester V. Nass**, associated for the past 14 years with Fairbanks, Morse & Co., during the last six of which he was assistant general superintendent of the Beloit, Wis., foundries, has joined Pettibone Mulliken Corp., Chicago, as manager of its foundry division.

• **H. A. Erickson** has been named sales engineer in charge of industrial technical service of the Watson-Standard Co., Pittsburgh, in northwestern Pennsylvania and central and western New York. Mr. Erickson, whose headquarters will be located at 148 Newton Ave., Jamestown, N. Y., was formerly with the Marietta Paint & Color Co.

• **H. L. Watson** has been elected president of the De Laval Steam Turbine Co., Trenton, N. J. Mr. Watson has been executive vice-president since 1934.

• **David R. Osborne**, sales training director for the Studebaker Corp., South Bend, Ind., has been elected president of the National Society of Sales Training Executives. Mr. Osborne, who succeeds **R. C. Cathcart**, educational director of the Texas Co., joined Studebaker on Jan. 1, 1927.

• **Loren Dickerson**, a member of the staff of Arthur D. Little, Inc., consultants on industrial research in Cambridge, Mass., was one of the 28 new members recently elected to membership in the 200 Associates of Phi Beta Kappa, the national scholastic honorary so-

ciety. He received a bachelor of science degree from Emory University, Atlanta, and will soon receive a doctor of science degree from Massachusetts Institute of Technology, where he studied a phase of fluid flow now used in research by the armed services.

• **Hugh C. Armstrong**, manager of the Monel metal and nickel department of Williams & Co., Inc., Pittsburgh, has been elected vice-president and general manager. Mr. Armstrong has been with Williams & Co. since 1927 and will continue to supervise that department in connection with his new duties.

• **Russel L. Whitney** has been appointed sales manager of the transformer division of the Westinghouse Electric & Mfg. Co., in Sharon, Pa. **A. C. Farmer**, formerly assistant sales manager, has been named assistant to the vice-president, and **A. P. Bender**, former sales manager, has been made assistant sales manager to afford the best possible opportunity for his complete recovery from an extended illness. For the past six years, Mr. Whitney was sales manager of Westinghouse's porcelain department in Derry, Pa. He joined Westinghouse 22 years ago shortly after he was graduated from the University of Colorado with a bachelor of science degree in electrical engineering. Mr. Farmer joined Westinghouse in 1909 at the East Pittsburgh Works and 10 years later was named manager of the distribution transformer section of the Supply Department. In 1931 he was appointed manager of distribution apparatus sales at headquarters, and was named assistant sales manager at Sharon in 1932. Mr. Bender went to Westinghouse in 1906 as an electrical engineering graduate of the University of Pittsburgh. Since 1934 he has been transformer division sales manager.

• **A. H. Philpot**, metallurgical engineer, has been appointed by Copperweld Steel Co., Warren, Ohio, to manage the Washington district office.

• **First Lieut. E. T. Bartron** has assumed his duties in the newly created post of assistant Air Forces resident representative at Bell Aircraft Corp., Buffalo. He formerly was attached to the Detroit AAF area office.

OBITUARY...

• **Frank J. Weschler**, vice-president of the Chain Belt Co. of Milwaukee, and general manager of Baldwin-Duckworth, a division of Chain Belt at Springfield and Worcester, Mass., died suddenly on Nov. 10, in Worcester. In 1927, Mr. Weschler became affiliated with the Baldwin Chain & Mfg. Co. of Worcester, as president and treasurer. Upon the merger of that company with the Duckworth Chain & Mfg. Co., in 1930, he became treasurer and general manager of the newly formed Baldwin-Duckworth Chain Corp. When Baldwin-Duckworth merged with the Chain Belt Co., in 1939, Mr. Weschler became vice-president of Chain Belt, and general manager of Baldwin-Duckworth.

• **H. Albert Schmidt**, one of the founders of the AC Spark Plug Co., died last week at Encino, Cal. He went to Flint, Mich., in 1908 and with Albert Champion they set up their spark plug company, which W. C. Durant later joined. Mr. Schmidt sold his holdings to General Motors in 1919 and retired as vice-president. Later, he was with Buick as an engineer and also designed racing cars.

• **Edward Willms**, vice-president of the Haack-Willms Mfg. Co., Milwaukee, died Nov. 9 from a heart attack, aged 57 years.

• **John J. Klein**, assistant secretary of the Marmon-Herrington Co., New York, died Nov. 15 after a four days' illness. He was 42 years old. Previous to his appointment as assistant secretary of the Marmon-Herrington Co., he served as assistant to A. W. Herrington, chairman of the board of directors, then president of the company.

• **Frederick Van Voorhees Lindsey**, vice-president and general sales manager of the Driver-Harris Co., Harrison, N. J., died Nov. 16, after a brief illness. In 1916 he became associated with the Electrical Alloy Co. as vice-president and general manager and in 1925, when the Electrical Alloy Co. was absorbed by the Driver-Harris Co., he was elected to the office held at the time of his death.

MACHINE TOOLS

... Sales, Inquiries and Market News

Aircraft Industry Getting Most of the Machine Tools

Cleveland

• • • With the amendment to the machine tool order E-1-b, issued Nov. 6, the aircraft industry was given the long green light on obtaining necessary equipment and a preferential standing on the urgency lists over every type of order for machine tools. Consequently, dealers and manufacturers have been for the past several days swamped with cancellations of existing orders for other than aircraft plants and with orders to divert deliveries to aircraft plants.

There is no question but what the WPB will make an all-out effort to produce during 1943 the 100,000 planes, double this year's quota, to give the United Nations unquestionable supremacy in the air over the enemy, and this is the first straw in the wind that the necessary all-out effort will be made.

Interpretations of the order from various sources have all been that the Air Force will be the No. 1 buyer, and all other requirements for machine tools take a back seat. At one ordnance office this week, a manufacturer consulting with ordnance officials was told that if a machine is not actually bolted to the floor, by this order the aircraft manufacturer can ask for it and very likely get it.

This condition unquestionably has brought about a general feeling among other ordnance manufacturers that if the machine tools are not going to be available, why try to set up for contracts. Furthermore, as a result of this order it is believed that some major contracts have been cancelled by the Army. One company scheduled to get into production of hand guns already had many of the necessary tools on hand and was awaiting delivery of the balance, but the contract was cancelled. It is quite likely that a new contract will be negotiated with the company for guns for aircraft.

Some officials of the local ord-

nance office, in commenting on the order, indicated that they felt that it wouldn't affect standing orders to any great extent because (1) the aircraft industry for the most part uses only tools of very high precision, made by a restricted number of manufacturers, and (2) most of the tools used by the industry are special purpose automatic types. The fallacy of this statement seems to lie in the fact that in the aircraft industry can be found tools made by practically every builder in the country.

The cancellations coming into dealers and builders are without a doubt going to materially reduce the estimated nine months backlog of orders of the machine tool industry. How much the backlog will be reduced is at present problematical, but it will bring nearer the day when the industry will catch up with itself.

A general move in this direction must have been expected in Washington since the expectations of a curtailment of allotments of iron and steel for the machine tool industry have been consistently gathering momentum in steel circles, and it is reported that talk along these lines developed in Washington.

Gas Rationing Poses a Transportation Problem

Cincinnati

• • • The advent of gasoline rationing in the Cincinnati area is causing added headaches to the already accumulated problems of local machine tool manufacturers. Many of the machine tool employees in this district live in outlying communities, public transportation to which is not overly efficient and the custom has been to use private cars. Of course, restrictions on tires generally has already increased the burden on public facilities, which in turn have also been restricted by ODT, thus necessarily making it almost imperative for machine tool personnel to commute by automobile. This is particularly true of second and third shifts.

With the governmental regulation on gas rationing not too clearly defined, personnel departments are being swamped with applications for increased rationing so that the employees may continue to get to and from their places of employment promptly and with dispatch. The effect of this uncertainty on worker morale is bound to be adverse.

Industrial Gear Sales Declined in October

• • • Sales of industrial gears during the month of October dropped 25 per cent below the September figure, according to the American Gear Manufacturers Association. The October figure is 1 per cent above the corresponding month of 1941. For the ten months of 1942 sales were 31 per cent higher than they were in the same period last year. The index figure does not include production of automotive gears or gears used in high speed turbine drives.



NON-FERROUS METALS

... Market Activities and Price Trends

Tin Smelter Capacity Has Margin for Loss

• • • The capacity of the Longhorn tin smelter at Texas City, after the present expansion program is completed, will be equivalent to the entire tin ore production now available to the United Nations, according to Charles B. Henderson, president of Metals Reserve Co.

"Although there are tin smelters operating in Great Britain, the Belgian Congo and in China, the possibility of enemy action damaging all or any of these plants must be considered," said Mr. Henderson. "Should that happen, the government tin smelter will be able to handle all the ores now going to the British and other United Nations plants."

Planned capacity for the smelter has been reported as 52,-

600 tons. This is obviously not sufficient to take care of the combined Belgian Congo, Bolivian and Nigerian ore production, which amounts to about 70,000 tons of tin content.

Mr. Henderson's report has been interpreted in some trade circles to mean that the Longhorn smelter would be able to fill in, should some of the United Nations smelter capacity be damaged or destroyed. The Congo ore is smelted in the Congo and sent, as refined tin, half to England and half to this country. Half the Bolivian ores goes to England and half to us, and all the Nigerian ore goes to England.

Mr. Henderson said the Gulf site was chosen for the smelter because of low fuel costs and cheap hydrochloric acid. Possible Atlantic and Pacific coast, and Ohio River valley sites were also con-

sidered, he said, adding, "The site was especially chosen with a view to continuing the tin smelting business in this country after the war." Although it has been assumed the Longhorn smelter would be permanent, this is one of the first official comments to that effect. Two smelters built during the last war were later abandoned, because of high costs.



• • • J. van den Broek, president of the Tin Processing Corp., which is operating the Longhorn smelter, has resigned to become Finance Minister of the Netherlands Government, in London. He will be succeeded by J. van den Berg, formerly vice-president and manager of the smelter. Ethelbert Warfield, of the law firm of Satterlee & Warfield, has been named chairman of the board.

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Non-Ferrous Mining Towns To Get 2000 Housing Units

• • • Federal funds have been made available for construction of 2,000 dwelling units for non-ferrous metal miners in seven western states, and the WPB has granted a blanket priority for the housing, it was announced Saturday.

To cover construction costs, \$6,000,000 has been allocated to the Federal Public Housing Authority. This emergency program was decided on by the War Manpower Commission, the War Department and the National Housing Agency to alleviate conditions where housing shortages threaten to interfere with production of essential non-ferrous metals. The states covered by the order are Arizona, Colorado, Idaho, New Mexico, Nevada, Utah and Wyoming.

Canada Sets Dealers' Non-Ferrous Scrap Prices

Toronto

• • • Canada has established maximum dealers' buying and selling prices for all non-ferrous scrap metals. Among the buying



Wide World Photo

TWO-WAR BUILDER: Harold Kingsley Ferguson, who built standard factory buildings for quick use in 1918, has been designated by Defense Plant Corp. to build 28 new plants for shredding, cleaning and detinning cans. Metal & Thermit Corp., veteran detinners, will give him technical assistance.

prices set are: No. 1 heavy copper, 10c a lb.; No. 2 copper wire, 9.25c; light copper and copper bottoms, 8.75c; industrial aluminum castings, 10c.; aluminum clippings, 14.50c.; aluminum wire and cable, 15.25c.; duralumin clippings, 11.75c; new zinc clippings, 4c.; battery plates, 2.30c.; cable lead, 3.70c.; block tin, 50c.; solder joints, 8.50c.

Selling prices are $\frac{1}{2}$ c. a lb. above buying prices. Briquetting premiums amount to $\frac{1}{2}$, 1 and $1\frac{1}{2}$ c. a lb., depending on the material.

American Brass Reduces Prices

••• A new price list has been issued by the American Brass Co. making reductions of 5c. a lb. from base prices on plates $\frac{1}{2}$ in. thick and thicker, of manganese bronze, Muntz metal, naval brass, Tobin bronze, and cupro-nickel, 20 and 30 per cent, or hot rolled. The reduction was made possible through savings from continuous 24-hr. operations, the company

said. The change was effective Nov. 16.

Fallen Idol

Philadelphia

••• A huge bronze Japanese idol standing over 15 ft. high and with a 9 ft. arm spread, which has stood for years in the entrance to the office of the Snellenburg department store was added recently to the civic scrap pile.

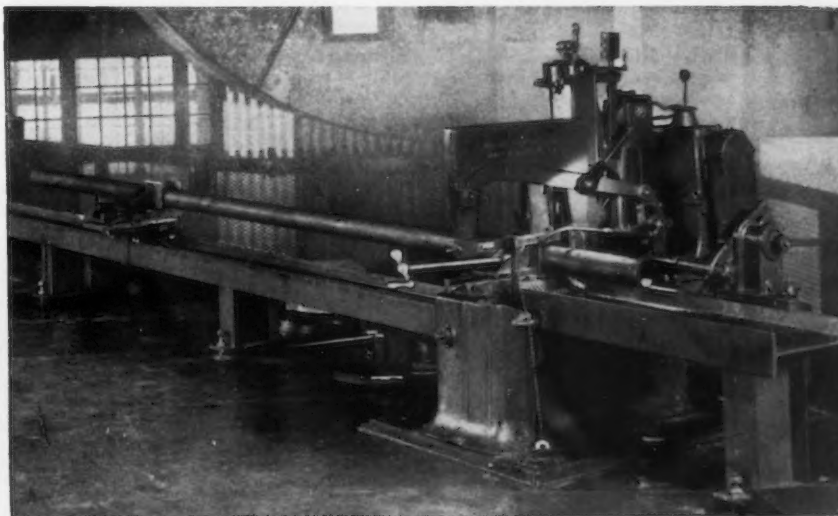
The idol weighed about 3000 lb. and was valued at about \$10,000. It was given to the store in 1880 by Japanese exporters, anxious to win the friendship of the American merchant.

Long abandoned copper mines at East Corinth, Vershire and South Strafford, Vt., are being reopened, the University of Vermont reports. The mines have been worked intermittently for more than a century. If studies by the Ohio Copper Co. of Utah justify building of a \$125,000 leaching plant, the Big Indian Copper property in Utah, first worked in 1917, may be reopened.

Parts of every conceivable shape and size will be made in a huge aluminum stamping plant which Reynolds Metals Co. is converting from a former tobacco warehouse. The wide variety of stampings will result in use of at least 80 per cent of the sheet area, it is expected.

The world's largest magnesium foundry, with an anticipated monthly production of more than 500,000 lb. of castings is nearing completion in Chicago and has been in partial operation for a month.

Four hundred soldiers have been furloughed for 90 days to work in the Coeur d'Alene mines in Idaho. The furlough automatically becomes indefinite if the men remain with one company for the 90-day period. A large proportion of the soldiers are said to be soft coal miners from the east, with no experience in hard rock metal mines. Evidently no plan has been worked out by which furloughed men can return to the kind of mining they left.



cut-off metal the economical way

The most economical method of cutting-off identical pieces from bar steel is with a MARVEL Automatic Production Saw. It will give you more pieces per hour, per machine and per dollar cost than any other accurate cutting-off method. Figured in cost per piece, it will have the lowest labor cost too, because MARVEL Automatic Saws operate with no more attention than an automatic screw machine. They keep chip loss down to a minimum and on many jobs will give you extra pieces per bar.

For fast automatic production or for single-cut miscellaneous work, MARVEL 6A or 9A Hack Saws are fast, accurate tools. Capacities 6" x 6" or 10" x 10", single or nested bars. Write today for Bulletin N. 600.



ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"
5700 Bloomingdale Ave.
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Eastern Sales Office:
225 Lafayette St., New York

SCRAP

... Market Activities and Quotation Trends

Flood of Allocations Stirs Dealers in East

•••The wave of allocations which deluged iron and steel scrap dealers in the East starting Nov. 11 was creating so much confusion early this week that it was likely a conference with steel mill buyers would be arranged. Rejections have been numerous.

Meanwhile, the scrap supply picture continued more comfortable than at any time in months. Mills in some sections of the nation were able to add more tonnage to their precious winter backlogs.

Up to Nov. 11, allocations had been reserved by WPB for meeting emergencies. Since reports from the field in recent weeks have not indicated the presence of emergencies, the reasons for the heavy WPB-directed movement are unknown. WPB so far has issued no clarification. It is contended by

many market authorities that allocations to far distant mills are such headaches that they should be ordered only sparingly and in conformity with actual needs.

Changes at Washington in the organization of the conservation division have been announced by Lessing Rosenwald, director. The General Salvage Section, the Industrial Salvage Section, the Scrap Processors Section and the Special Projects Salvage Section have all become branches instead of sections. R. K. White is head of the general salvage; Hamilton Wright is in charge of industrial salvage; Merrill Stubbs is chief of the scrap processors, and J. W. Bertch is in charge of special projects.

WPB announced Nov. 18 that the Iron and Steel Scrap Order as amended Oct. 13 erroneously required filing of PD-149A. A correction has been made.

Supply Picture Seen Temporarily Better

Pittsburgh

•••Temporarily at least, scrap is reported more abundant, enabling some plants to build better winter supplies for the difficult months ahead. The real test of the winter is expected to come in February.

Some mills are said to have taken the stand they will not accept remote scrap with its higher net prices. Some consumers are reported limiting the amount of springboard they will pay.

The successive drives conducted at homes, farms and industrial plants, with the help of liberal newspaper publicity, have built up a large pile of scrap throughout the country. Some sources say not more than 50 per cent of this type of scrap has yet reached the mills. It is pointed out, however, that this piling at yards, city dumps, etc., represents a favorable hedge against a tough winter.

More reassuring lately has been the blowing in of new blast furnaces. This has relieved scrap shortages at those points where more iron became available. Several more furnaces are to come into production between now and March 30, 1943.

Barring a most severe winter, it is believed that the present supply of scrap plus the normal flow will be enough to eliminate the possibility of a drastic drop in steel output this winter. Another factor adding to the plus side is the change in lend-lease steel distribution which will be reflected by an increase in the amount of so-called home scrap.

Most scrap observers do not look upon the present situation as being permanent. It is warned that periodic scrap drives must be continued.

WPB Branch Requisitions Scrap from Old Foundry

Houghton, Mich.

•••The WPB Materials Redistribution Branch requisitioned approximately 120 tons of iron and steel scrap at the old Carroll Steel

LUFTWAFFE GRAVEYARD: 400 engines from German fighter and bomber aeroplanes are dumped in this English waste metal yard. Many of the engines when picked up are in good running order, but they are melted down into new aircraft parts for the United Nations.

British Combine Photo



Foundry Co., which has been in-operative since it went into receivership 10 years ago. The receivers for the company will be paid \$13.04 per ton through Metals Reserve Corp., acting as agent for WMI.

Included in the old foundry equipment scattered in the company's yard was a large, obsolete lathe said to have been used to turn the turret for the famous ironclad "Monitor" which fought for the North in the Civil War in 1862. Scrap involved in the requisitioning included other miscellaneous equipment, boilers and ladles.

The scrap will be picked up and processed by the J. H. Green Co., Hancock, Mich., high bidders on the project.

CHICAGO—Chicago district steel mills have at least a 30-day supply of steel scrap on hand, Max Witt of the conservation division of WPB last week told a meeting of the National Association of Waste Material Dealers. He warned, however, that this supply was still far from sufficient to carry the mills through the winter months. Witt expressed the opinion that the manpower problem was more serious in the steel scrap yards than in the non-ferrous scrap field. He added that Washington is now studying this problem.

BUFFALO—Steady improvement in moving the huge piles of scrap dumped on them in recent weeks is reported by nearly all yard operators here despite a grave manpower situation. Mill reserves continue good for two to three months but yard proprietors are complaining more loudly than ever that the right kind of labor cannot be had at any price. Junk dealers are having a difficult time adopting a schedule all would pay for scrap. Those favoring the move complain others are staying out, preferring to operate on a smaller margin of profit by paying higher prices to persons having junk for sale. The Buffalo War Council's salvage committee is trying to iron out the wrinkles.

BIRMINGHAM—Receipt of scrap by mills in this district just about meets present requirements. Mills are not dipping into inventories but neither are they accumulating any considerable surpluses. During October, 183 Alabama industrial plants salvaged 17,500 tons of metal, Associated Industries of Alabama reported.

CINCINNATI—The market shows relatively no change, with dealers still spending all efforts to move tonnage recently collected on household drives. The progress of the industrial drive continues encouraging. In one or two instances melters are apparently well enough supplied to be out of the market.

TORONTO—Local dealers report record scrap receipts as the result of the

salvage drive for old iron and steel and other metals in southern Ontario started on the first of the month. Local scrap supply also is increasing insofar as war plants are concerned, but only small tonnages are coming from auto wreckers. Dealers, through labor shortages, have been forced to build very extensive yard stocks for future sorting, but are maintaining regular shipments to consumers. Mills also are well stocked, and with regular deliveries from dealers and brokers are said to have enough scrap assured for needs over the next three months. So far this year western Canada has shipped about 140,000 tons to Eastern consumers and another 20,000 tons is expected.

DETROIT—Chevrolet dealers have gathered approximately 10,000 tons of scrap metal since their nation-wide collection drive began, a report from the factory showed late in November. In addition, the dealers junked 1987 used cars, adding an estimated additional 1800 tons to the scrap metal pile.

NEW YORK—Eastern mills, well supplied with scrap, are reported holding up shipments. Most of the dealers in this area, however, have received WPB allocations for shipment to Pittsburgh. One estimate is that nearly half of current business is with the Pittsburgh area. Bethlehem Steel Co. has canceled its contract with the city to purchase 500 tons of household drive scrap a day, after

taking 800 tons altogether. The company offered to continue purchasing scrap f.o.b. cars at \$7.50, but the city considered a maximum profit of \$1.75 a ton probable and a loss possible, at this price. Dealers have taken about 8200 tons so far, the city reports.

PHILADELPHIA—For the sixth consecutive week shipments have increased, reaching a peak which is causing at least one producer to issue stop shipment orders temporarily and causing others to consider such action. All steel producers claim a high percentage of shipments being received consist of turnings and light scrap prepared from household collections. The percentage of turnings has been so great that some have stopped shipment on this grade to rebalance stocks with heavier grades. The one producer which has stopped all scrap receipts temporarily did so because 167 cars were received in a single day. Producers report scrap backlogs varying from a 40 day to 2½ month supply.

CLEVELAND—November scrap shipments to the mills to date have been very heavy, indicating that much of the material collected in scrap drives is on its way to the mills. Scrap piles at the mills have been hiked up to some extent, but not near enough for all-winter operations. Stocks are estimated in the district to average between three and four weeks' operations, and supplies are still coming in substantial quantities.

CLEVELAND SCRAP SEEKERS: Steel and warehouse salesmen and executives are shown at a recent meeting to intensify their efforts in the industrial salvage drive. Seated (left to right) R. M. Beutel, Paterson-Leitch Co.; P. B. Gilroy, American Steel & Wire Co., chairman; and W. E. Collier, Republic Steel Corp. Standing (left to right) W. P. Andrews, Carnegie-Illinois Steel Corp.; John Deibel, regional chief of the WPB Industrial Salvage Section; and R. W. Kemp Smith, Bethlehem Steel Co.



SCRAP PRICES

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES		BLAST FURNACE GRADES		Low Phos.			and Plate			Steel Scrap			Alloy Free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
	(No. 1 Heavy Melting; No. 1 Hydr. Compressed Black Sheets, No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)	Unbald* Machine Shop Turnings	(Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)	No. 2 Busheling	Billet, Bloom, Forge Crops	Bar Crops, Punchings Plate Scrap and Cast Steel	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under				
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton, Cleveland, Middletown, Cincinnati, Portsmouth, Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt., Ashland, Ky., Buffalo, N. Y., Bethlehem, Pa.; Kokomo, Ind., Duluth, Minn., Detroit, Mich., Toledo, Ohio, St. Louis, Mo., Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburgh, Cal.; San Francisco, Minnequa, Colo., Seattle, Wash.	\$20.00 19.50 18.75 19.50 19.25 18.25 18.00 17.85 17.50 17.00 16.50 14.50	\$16.00 15.50 14.75 15.50 15.25 14.25 14.00 13.85 13.85 13.50 13.00 12.50 10.50	\$16.00 15.50 14.75 15.50 15.25 14.25 14.00 13.85 13.85 13.50 13.00 12.50 10.50	\$17.50 17.00 16.25 16.75 18.75 15.50 15.35 22.85 15.00 14.00 12.00	\$25.00 24.50 23.75 24.50 23.25 23.00 22.85 22.50 22.00 21.50 19.50	\$22.50 22.00 21.25 22.00 21.75 20.50 20.35 20.00 19.50 19.00 17.00	\$21.00 20.50 19.75 20.50 20.25 19.00 18.85 18.50 18.00 17.50 15.50	\$21.50 21.00 20.25 20.75 20.25 19.75 19.50 19.35 19.00 18.50 16.00	\$22.00 21.50 20.75 20.25 20.25 20.00 19.85 19.50 19.00 18.50 16.50	\$20.00 19.50 18.75 20.00 19.25 18.00 17.85 17.50 17.00 16.50 14.50	\$20.50 20.00 19.25 19.50 18.75 18.50 18.35 18.00 17.50 17.00 15.00	\$21.00 20.50 19.75 20.25 19.25 18.75 18.50 18.35 18.00 17.50 15.00	\$18.00 17.50 16.75 17.50 17.25 16.25 16.00 15.85 15.50 15.00 12.50	\$19.50 19.00 18.25 18.75 18.25 17.75 17.50 17.35 17.00 16.50 14.00	\$21.00 20.50 19.75 20.25 19.25 18.75 18.50 18.35 18.00 17.50 15.00	

*Baled turnings are \$4 per gross ton higher. Dealers may charge \$2 per ton for crushing other than heavy turnings. An industrial producer may charge \$1.

BUNDLES: Tin can bundles are \$4 below dealers' No. 2 bundles; No. 3 bundles are \$2 less than No. 1 heavy melting.

AT NEW YORK city or Brooklyn, the maximum shipping point price is \$15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is \$15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of \$6.65 per ton.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburgh, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, cut auto scrap and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation

charge by rail or water or combination thereof. In lieu of dock charge add 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be \$2.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made \$4) less the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge \$2.50 per ton on consumer-owned unprepared remote scrap (see order). A preparation-in-transit charge for allocated unprepared scrap is provided.

Maximum price of all scrap in a vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed. For special preparation charges, consult official order.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), \$1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), \$2 less than No. 1 heavy melting. If loaded in box cars add 75c.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of \$2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA.

*At Memphis 50c.; Great Lakes ports \$1; New England \$1.25.

RAILROAD SCRAP

	Scrap Rails					
	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	3 ft. and Under	2 ft. and Under	18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown, Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown, Chicago, Philadelphia, Sparrows Pt., Wilmington, Birmingham, Los Angeles, San Francisco, Buffalo, Detroit, Duluth, Kansas City, Mo., Kokomo, Ind., Seattle, St. Louis	\$20.50 21.00 19.75 18.00 20.25 18.85 19.00 17.00 19.25 15.50 18.50	\$21.50 22.00 20.75 19.00 21.25 19.85 20.00 18.00 20.25 16.50 19.50	\$23.00 23.50 22.25 20.50 21.35 21.35 21.50 19.50 21.75 18.00 21.00	\$23.50 24.00 22.75 21.00 21.85 21.85 22.00 20.00 22.25 18.50 21.50	\$23.75 24.25 23.00 21.25 22.10 22.10 20.25 22.50 22.50 18.75 21.75	\$24.00 24.50 23.25 21.50 22.35 22.35 22.50 20.50 22.75 19.00 22.00

CAST IRON SCRAP

	Group A	Group B	Group C
No. 1 cupola cast	\$18.00	\$19.00	\$20.00
No. 1 machinery cast, drop broken, 150 lbs. and under	18.00	19.00	20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	17.50	18.50	19.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switching district of Kansas City, Kan., Mo.

Composite Prices

Advances Over Past Week in Heavy Type; Declines in *Italics*.

(Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	Nov. 24, 1942	Nov. 17, 1942	Oct. 27, 1942	Nov. 25, 1941
Hot rolled sheets.....	2.10	2.10	2.10	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip.....	2.10	2.10	2.10	2.10
Cold rolled strip.....	2.80	2.80	2.80	2.80
Plates.....	2.10	2.10	2.10	2.10
Plates, wrought iron....	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate: (Dollars Per Base Box)

Tin plate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tin plate, electrolytic....	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes: (Cents Per Lb.)

Merchant bars.....	2.15	2.15	2.15	2.15
Cold finished bars.....	2.65	2.65	2.65	2.65
Alloy bars.....	2.70	2.70	2.70	2.70
Structural shapes.....	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars.....	4.40	4.40	4.40	4.40

Wire and Wire Products: (Cents Per Lb.)

Plain wire.....	2.60	2.60	2.60	2.60
Wire nails.....	2.55	2.55	2.55	2.55

Rails:

(Dollars Per Gross Ton)

Heavy rails.....	\$40.00	\$40.00	\$40.00	\$40.00
Light rails.....	40.00	40.00	40.00	40.00

Semi-Finished Steel:

(Dollars Per Gross Ton)...

Rerolling billets.....	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars.....	34.00	34.00	34.00	34.00
Slabs.....	34.00	34.00	34.00	34.00
Forging billets.....	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp:

(Cents Per Lb.)

Wire rods.....	2.00	2.00	2.00	2.00
Skelp (grvd).....	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 133 to 140 herein.

Pig Iron:

(Per Gross Ton)

	Nov. 24, 1942	Nov. 17, 1942	Oct. 27, 1942	Nov. 25, 1941
No. 2 fdy., Philadelphia.	\$25.89	\$25.89	\$25.89	\$25.84
No. 2, Valley furnace...	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti....	24.68	24.68	24.68	24.06
No. 2, Birmingham.....	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa...	25.39	25.39	25.39	25.34
Basic, Valley furnace...	23.50	23.50	23.50	23.50
Malleable, Chicago†....	24.00	24.00	24.00	24.00
Malleable, Valley.....	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago..	31.34	31.34	31.34	31.34
Ferromanganese†.....	135.00	135.00	135.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

‡For carlots at seaboard.

Scrap:

(Per Gross Ton)

Heavy melting steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh...	20.00	20.00	20.00	22.00
No. 1 cast, Philadelphia.	20.00	20.00	20.00	24.00
No. 1 cast, Ch'go.....	20.00	20.00	20.00	20.00

Coke, Connellsville:

(Per Net Ton at Oven)

Furnace coke, prompt...	\$6.00	\$6.00	\$6.00	\$6.125
Foundry coke, prompt...	6.875	6.875	6.875	6.875

Non-Ferrous Metals:

(Cents per Lb. to Large Buyers)

Copper, electro., Conn...	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis....	8.25	8.25	8.25	8.25
Lead, St. Louis.....	6.35	6.35	6.35	5.70
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

Comparison of Prices

FINISHED STEEL

Nov. 24, 1942.....	2.30467c. a Lb.....
One week ago.....	2.30467c. a Lb.....
One month ago.....	2.30467c. a Lb.....
One year ago.....	2.30467c. a Lb.....

PIG IRON

.....23.61 a Gross Ton.....
.....23.61 a Gross Ton.....
.....23.61 a Gross Ton.....
.....23.61 a Gross Ton.....

SCRAP STEEL

.....\$19.17 a Gross Ton.....
.....\$19.17 a Gross Ton.....
.....\$19.17 a Gross Ton.....
.....\$19.17 a Gross Ton.....

	HIGH	LOW
1942.....	2.30467c.,	2.30467c.,
1941.....	2.30467c.,	2.30467c.,
1940.....	2.30467c., Jan. 2	2.24107c., Apr. 16
1939.....	2.35367c., Jan. 3	2.26689c., May 16
1938.....	2.58414c., Jan. 4	2.27207c., Oct. 18
1937.....	2.58414c., Mar. 9	2.32263c., Jan. 4
1936.....	2.32263c., Dec. 28	2.05200c., Mar. 10
1935.....	2.07642c., Oct. 1	2.06492c., Jan. 8
1934.....	2.15367c., Apr. 24	1.95757c., Jan. 2
1933.....	1.95578c., Oct. 3	1.75836c., May 2
1932.....	1.89196c., July 5	1.83901c., Mar. 1
1931.....	1.99629c., Jan. 13	1.86586c., Dec. 29
1930.....	2.25488c., Jan. 7	1.97319c., Dec. 9
1929.....	2.31773c., May 28	2.26498c., Oct. 29

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

	HIGH	LOW
.....\$23.61	\$23.61	\$23.61
23.61, Mar. 20	23.45, Jan. 2	
23.45, Dec. 23	22.61, Jan. 2	
22.61, Sept. 19	20.61, Sept. 12	
23.25, June 21	19.61, July 6	
23.25, Mar. 9	20.25, Feb. 16	
19.74, Nov. 24	18.73, Aug. 11	
18.84, Nov. 5	17.83, May 14	
17.90, May 1	16.90, Jan. 27	
16.90, Dec. 5	13.56, Jan. 3	
14.81, Jan. 5	13.56, Dec. 6	
15.90, Jan. 6	14.79, Dec. 15	
18.21, Jan. 7	15.90, Dec. 16	
18.71, May 14	18.21, Dec. 17	

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	HIGH	LOW
.....\$19.17	\$19.17	\$19.17
\$22.00, Jan. 7	\$19.17, Apr. 10	
21.83, Dec. 30	16.04, Apr. 9	
22.50, Oct. 3	14.08, May 16	
15.00, Nov. 22	11.00, June 7	
21.92, Mar. 30	12.92, Nov. 10	
17.75, Dec. 21	12.67, June 9	
13.42, Dec. 10	10.33, Apr. 29	
13.00, Mar. 13	9.50, Sept. 25	
12.25, Aug. 8	6.75, Jan. 3	
8.50, Jan. 12	6.43, July 5	
11.33, Jan. 6	8.50, Dec. 29	
15.00, Feb. 18	11.25, Dec. 9	
17.58, Jan. 29	14.08, Dec. 3	

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel...

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, reductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product													10 DELIVERED TO				
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia		
SHEETS																	
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢		
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢		
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢		
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢		
Long ternes ²	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢		
STRIP																	
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢			
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.92¢	3.18¢			
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢			
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.07¢	3.33¢			
TIN MILL PRODUCTS																	
Coke tin plate, base box	\$5.00	\$5.00	\$5.00						\$5.10					5.38¢	5.34¢		
Electrolytic tin plate, box	\$4.50		\$4.50														
Black plate, 20 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ ¹²			3.39¢		
Mfg. ternes, special box	\$4.30	\$4.30	\$4.30						\$4.40								
BARS																	
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.52¢	2.80¢	2.27¢	2.51¢	2.49¢		
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢					
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢ ¹³	2.27¢	2.40¢			
Reinforcing (rail) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢ ¹³	2.27¢		2.49¢		
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					3.01¢	2.99¢		
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		Bethlehem, Massillon, Canton = 2.70¢					2.82¢				
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢				
								(Coatesville and Claymont = 2.10¢)									
PLATES																	
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢ ¹¹		2.47¢	2.65¢	2.33¢	2.30¢	2.155¢		
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢		
Alloy	3.50¢	3.50¢									3.97¢	4.15¢		3.71¢	3.60¢		
SHAPES																	
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.47¢	2.75¢		2.28¢	2.22¢		
SPRING STEEL, C-R																	
0.26 to 0.50 Carbon	2.80¢			2.80¢				(Worcester = 3.00¢)									
0.51 to 0.75 Carbon	4.30¢			4.30¢				(Worcester = 4.50¢)									
0.76 to 1.00 Carbon	6.15¢			6.15¢				(Worcester = 6.35¢)									
1.01 to 1.25 Carbon	8.35¢			8.35¢				(Worcester = 8.55¢)									
WIRE⁹																	
Bright ¹⁵	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester = 2.70¢)				3.10¢			2.94¢		
Galvanized								add proper size extra and galvanized extra to bright wire base, above.									
Spring (High Carbon)	3.20¢	3.20¢		3.20¢				(Worcester = 3.30¢)				3.70¢			3.54¢		
PILING																	
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢		

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to certain width and length limitations. ⁶ For merchant trade. ⁷ Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lot to manufacturing trade. ¹⁰ These prices do not apply if the customary means of transportation (rail and water) are not used. ¹¹ Ship plates only. ¹² Boxed. ¹³ Portland and Seattle price, San Francisco price is 2.50c. ¹⁴ This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

GOVERNMENT CEILINGS—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices, which are on another page of this issue.

EXCEPTIONS TO PRICE SCHEDULE No. 6—On hot rolled carbon bars, Phoenix Iron Co. may quote 2.35c. at established basing points; Calumet Steel division of Borg Warner may quote 2.35c., Chicago, on bars from its 8-in. mill; Joslyn Mfg. Co. may quote 2.35c., Chicago base. On rail steel bars Sweets Steel Co. may quote 2.33c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote for shipment to Detroit area on Middletown base. On galvanized sheets, Andrews Steel may quote 3.75c., at established basing points. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.20c., f.o.b. basing points. On shapes, Phoenix Iron Co. may quote 2.30c. established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp. may charge 2.40c. On tubing, South Chester Tube Co. may price Gulf or Pacific Coast all-rail shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Colorado Fuel & Iron Corp. may sell f.o.b. mill. **SEMI-FINISHED STEEL**—Follansbee Steel Corp. may sell forging billets at \$49.50 f.o.b. Toronto; Continental Steel Corp. may sell Acme Steel Co. at \$34 for rerolling billets plus extras and freight; Ford Motor Co. may sell rerolling billets at \$34 f.o.b. Dearborn; Andrews Steel Co. may sell forging billets at \$50 at established basing points and slabs at \$41; Empire Sheet and Tin Plate may sell slabs at \$41 at established basing points and sheet bars at \$39 f.o.b. mill; on lend-lease sales Northwestern Steel & Wire Co. may charge \$41 per gross ton f.o.b. mill for rerolling billets; on lend-lease sales Wheeling Steel Corp. may charge \$36 per ton for small billets, f.o.b. Portsmouth and \$37 per ton for sheet bars f.o.b. Portsmouth; Laclede Steel Co. on semifinished sales for lend-lease shipped to eastern seaboard may use Chicago basing point prices f.o.b. Alton and Madison, Ill. **ALLOY STEEL BARS**—Texas Steel Co. may use Chicago base f.o.b. Fort Worth.

CAPACITY OPERATION

proves dependability of Armstrong's Refractories

THE test of peak production tells the true story of refractory performance. And that's the test Armstrong's Refractories are now taking . . . the test that proves these brick have the *efficiency* and the *stamina* to stand today's terrific pace.

Five types of Armstrong's Insulating Brick (for temperatures from 1600°-2600°) are on the job. All have the following physical characteristics which make them ideally suited to most furnace applications:

High Insulating Efficiency: These brick effectively bar heat loss. They aid in accurate heat control and thus help insure uniform, high quality production.

High Physical Strength: Every Armstrong's Brick, though light in weight, is

highly resistant to spalling, has exceptional crushing and breaking strength (hot and cold) and ample refractoriness for the use intended.

Low Heat Storage: These lightweight refractories heat and cool quickly—speed cycles in intermittent type furnaces—cut fuel costs per cycle.

If you want refractories that are *tough*, *efficient*, and thoroughly *dependable*, get the facts about Armstrong's Insulating Fire Brick. Armstrong Engineers will help you choose the right brick and the right cement for maximum operating and combustion efficiency. Write today to Armstrong Cork Co., Insulating Refractories Dept., 978 Concord St., Lancaster, Pa.



ARMSTRONG'S INSULATING REFRACTORIES

PRICES

SEMI-FINISHED STEEL

For exceptions, see preceding page

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.25 higher; f.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton
Rerolling \$34.00
Forging quality 40.00
Alloy Steel: Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton \$54.00

Shell Steel

Per Gross Ton
3 in. to 12 in. \$52.00
12 in. to 18 in. 54.00
18 in. and over 56.00
Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.
Prices delivered Detroit are \$2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open hearth or bessemer \$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared .. 1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Lb.
Pittsburgh, Chicago, Cleveland ... 2.00c.
Worcester, Mass. 2.10c.
Birmingham 2.00c.
San Francisco 2.50c.
Galveston 2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

Base per lb.
High speed 67c.
Straight molybdenum 54c.
Tungsten-molybdenum 57 1/2c.
High-carbon-chromium 43c.
Oil hardening 24c.
Special carbon 22c.
Extra carbon 18c.
Regular carbon 14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F. Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

NATIONAL EMERGENCY STEELS (Hot Rolled)

Extras for Alloy Content

Designa- tion	CHEMICAL COMPOSITION LIMITS, PER CENT								Basic Open-Hearth		Electric Furnace	
	Carbon	Man- ganese	Phos- phorus Max.	Sul- phur Max.	Silicon	Chro- mium	Nickel	Molyb- denum	Bars and Bar Strip	Billets, Blooms and Slabs	Bars and Bar Strip	Billets, Blooms and Slabs
NE 1330	.28 / .33	1.60 / 1.90	.040	.040	.20 / .35				.10c	\$2.00		
NE 1335	.33 / .38	1.60 / 1.90	.040	.040	.20 / .35				.10	2.00		
NE 1340	.38 / .43	1.60 / 1.90	.040	.040	.20 / .35				.10	2.00		
NE 1345	.43 / .48	1.60 / 1.90	.040	.040	.20 / .35				.10	2.00		
NE 1350	.48 / .53	1.60 / 1.90	.040	.040	.20 / .35				.10	2.00		
NE 8020	.18 / .23	1.00 / 1.30	.040	.040	.20 / .35			.10 / .20	.45	9.00	.95c	\$19.00
NE 8022	.20 / .25	1.00 / 1.30	.040	.040	.20 / .35			.10 / .20	.45	9.00	.95	19.00
NE 8339	.37 / .42	1.30 / 1.60	.040	.040	.20 / .35			.20 / .30	.75	15.00	1.25	25.00
NE 8442*	.40 / .45	1.30 / 1.60	.040	.040	.20 / .35			.30 / .40	.90	18.00	1.40	28.00
NE 8613	.12 / .17	.70 / .90	.040	.040	.20 / .35	.40 / .60	.40 / .60	.15 / .25	.75	15.00	1.25	25.00
NE 8616	.13 / .18	.70 / .90	.040	.040	.20 / .35	.40 / .60	.40 / .60	.15 / .25	.75	15.00	1.25	25.00
NE 8617	.15 / .20	.70 / .90	.040	.040	.20 / .35	.40 / .60	.40 / .60	.15 / .25	.75	15.00	1.25	25.00
NE 8620	.18 / .23	.70 / .90	.040	.040	.20 / .35	.40 / .60	.40 / .60	.15 / .25	.75	15.00	1.25	25.00
NE 8630	.28 / .33	.70 / .90	.040	.040	.20 / .35	.40 / .60	.40 / .60	.15 / .25	.75	15.00	1.25	25.00
NE 8715	.13 / .18	.70 / .90	.040	.040	.20 / .35	.40 / .60	.40 / .60	.20 / .30	.80	16.00	1.30	26.00
NE 8720	.18 / .23	.70 / .90	.040	.040	.20 / .35	.40 / .60	.40 / .60	.20 / .30	.80	16.00	1.30	26.00
NE 8722	.20 / .25	.70 / .90	.040	.040	.20 / .35	.40 / .60	.40 / .60	.20 / .30	.80	16.00	1.30	26.00
NE 8735	.33 / .38	.75 / 1.00	.040	.040	.20 / .35	.40 / .60	.40 / .60	.20 / .30	.80	16.00	1.30	26.00
NE 8739	.35 / .40	.75 / 1.00	.040	.040	.20 / .35	.40 / .60	.40 / .60	.20 / .30	.80	16.00	1.30	26.00
NE 8740	.38 / .43	.75 / 1.00	.040	.040	.20 / .35	.40 / .60	.40 / .60	.20 / .30	.80	16.00	1.30	26.00
NE 8744	.40 / .45	.75 / 1.00	.040	.040	.20 / .35	.40 / .60	.40 / .60	.20 / .30	.80	16.00	1.30	26.00
NE 8749	.45 / .50	.75 / 1.00	.040	.040	.20 / .35	.40 / .60	.40 / .60	.20 / .30	.80	16.00	1.30	26.00
NE 8949*	.45 / .50	1.00 / 1.30	.040	.040	.20 / .35	.40 / .60	.40 / .60	.30 / .40	1.20	24.00	1.70	34.00
NE 9255	.50 / .60	.70 / .95	.040	.040	1.80 / 2.20				.40c	8.00		
NE 9260	.55 / .65	.75 / 1.00	.040	.040	1.80 / 2.20				.40	8.00		
NE 9262	.55 / .65	.75 / 1.00	.040	.040	1.80 / 2.20	.20 / .40			.65	13.00		
NE 9415	.13 / .18	.80 / 1.10	.040	.040	.40 / .60	.20 / .40	.20 / .40	.08 / .15	.80	16.00	1.30c	\$26.00
NE 9420	.18 / .23	.80 / 1.10	.040	.040	.40 / .60	.20 / .40	.20 / .40	.08 / .15	.80	16.00	1.30	26.00
NE 9422	.20 / .25	.80 / 1.10	.040	.040	.40 / .60	.20 / .40	.20 / .40	.08 / .15	.80	16.00	1.30	26.00
NE 9430	.28 / .33	.90 / 1.20	.040	.040	.40 / .60	.20 / .40	.20 / .40	.08 / .15	.80	16.00	1.30	26.00
NE 9435	.33 / .38	.90 / 1.20	.040	.040	.40 / .60	.20 / .40	.20 / .40	.08 / .15	.80	16.00	1.30	26.00
NE 9437	.35 / .40	.90 / 1.20	.040	.040	.40 / .60	.20 / .40	.20 / .40	.08 / .15	.80	16.00	1.30	26.00
NE 9440	.38 / .43	.90 / 1.20	.040	.040	.40 / .60	.20 / .40	.20 / .40	.08 / .15	.80	16.00	1.30	26.00
NE 9442	.40 / .45	1.00 / 1.30	.040	.040	.40 / .60	.20 / .40	.20 / .40	.08 / .15	.85	17.00	1.35	27.00
NE 9445	.43 / .48	1.00 / 1.30	.040	.040	.40 / .60	.20 / .40	.20 / .40	.08 / .15	.85	17.00	1.35	27.00
NE 9450	.48 / .53	1.20 / 1.50	.040	.040	.40 / .60	.20 / .40	.20 / .40	.08 / .15	.85	17.00	1.35	27.00
NE 9537*	.35 / .40	1.20 / 1.50	.040	.040	.40 / .60	.40 / .60	.40 / .60	.15 / .25	1.20	24.00	1.70	34.00
NE 9540*	.38 / .43	1.20 / 1.50	.040	.040	.40 / .60	.40 / .60	.40 / .60	.15 / .25	1.20	24.00	1.70	34.00
NE 9542*	.40 / .45	1.20 / 1.50	.040	.040	.40 / .60	.40 / .60	.40 / .60	.15 / .25	1.20	24.00	1.70	34.00
NE 9550*	.48 / .53	1.20 / 1.50	.040	.040	.40 / .60	.40 / .60	.40 / .60	.15 / .25	1.20	24.00	1.70	34.00
NE 9630	.28 / .33	1.20 / 1.50	.040	.040	.40 / .60	.40 / .60			.80	16.00	1.30	26.00
NE 9635	.33 / .38	1.20 / 1.50	.040	.040	.40 / .60	.40 / .60			.80	16.00	1.30	26.00
NE 9637	.35 / .40	1.20 / 1.50	.040	.040	.40 / .60	.40 / .60			.80	16.00	1.30	26.00
NE 9640	.38 / .43	1.20 / 1.50	.040	.040	.40 / .60	.40 / .60			.80	16.00	1.30	26.00
NE 9642	.40 / .45	1.30 / 1.60	.040	.040	.40 / .60	.40 / .60			.85	17.00	1.35	27.00
NE 9645	.43 / .48	1.30 / 1.60	.040	.040	.40 / .60	.40 / .60			.85	17.00	1.35	27.00
NE 9650	.48 / .53	1.30 / 1.60	.040	.040	.40 / .60	.40 / .60			.85	17.00	1.35	27.00

*Recommended for large sections only.

Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., on finished products and \$54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh) Per Lb.

Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

	Base per Keg
Standard wire nails	\$2.55
Coated nails	2.55
Cutnails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	\$3.05
Annealed galvanized fence wire	3.40
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbed wire	70

*15 1/2 gage and heavier. †On 80-rod spools in carload quantities.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb. gross ton	\$40.00
Angle bars, 100 lb.	2.70
(F.o.b. Basing Points) Per Gross Ton	
Light rails (from billets)	\$40.00
Light rails (from rail steel)	39.00

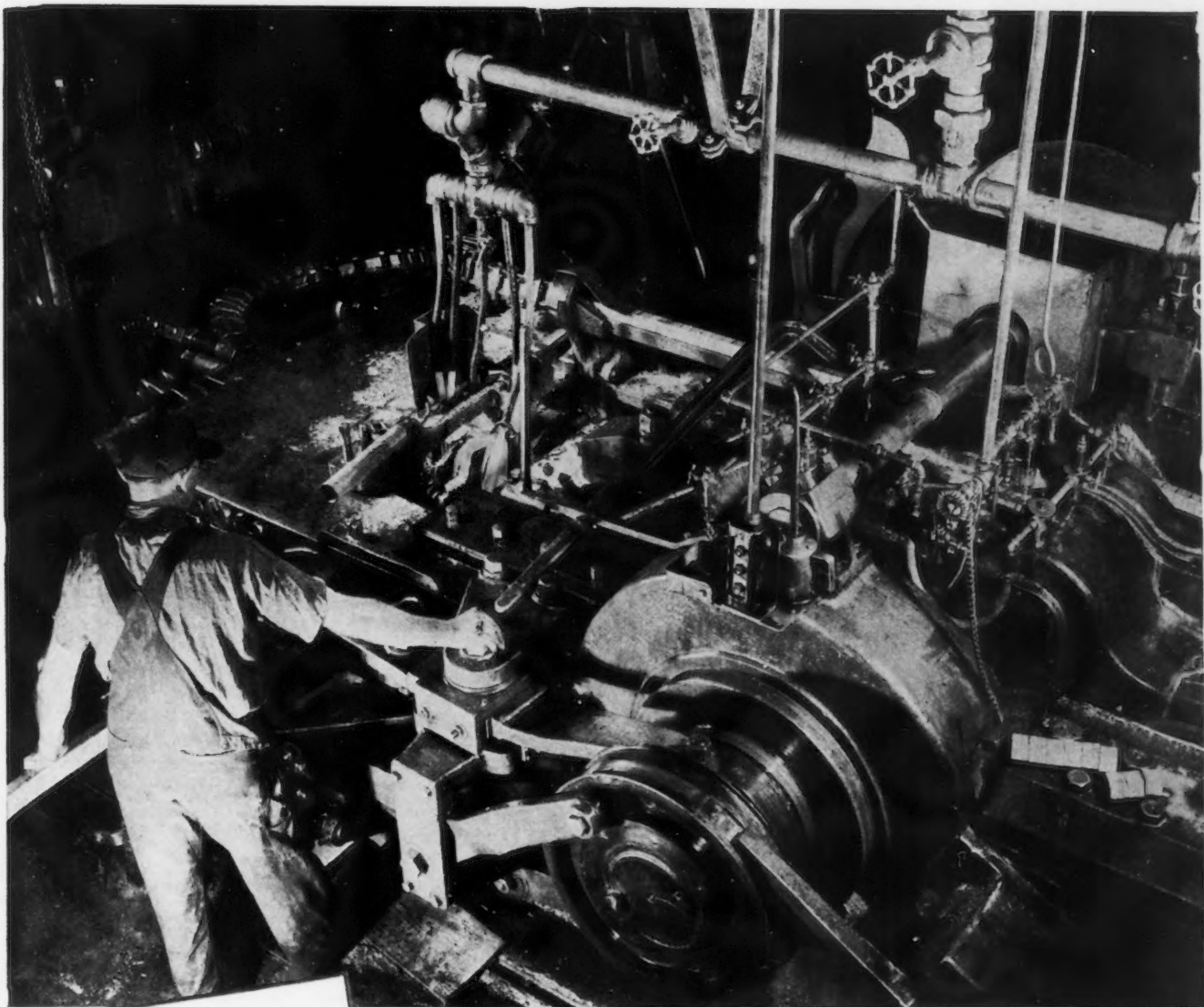
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00



**Extra punch
in the jaws
of metal
juggernauts**

Repunching (an exclusive RB&W process) clears out strained and torn surfaces left from the first punch—and makes possible perfect fit and easy rightening of RB&W nuts. It also prevents use of defective metal, for a nut made from piped or seamy bar will split when re-punched.

"DEFENSE" — "Numerical Superiority" — "Sheer Weight of Men and Metal" — are *not* winning the war.

It's generalship of attack, with better equipment better fitted to its specific tasks, that must put the *extra punch* into our mechanized combat teams.

Here at R B & W, we're putting a *qualitative plus* into the bolts and nuts that war plants today are buying by the train load, a plus that enables war equipment to be assembled *faster* with accurate, clean-threaded R B & W fasteners.

R B & W's three great plants — its one-purpose nut plant at Coraopolis is the only one of its kind in the world —

assure tremendous output to fill the assembly needs of the tanks and tractors, bridges, mining and farming equipment that make and keep America strong.

But even more important, we feel, are the special RB&W processes—one of them illustrated above—which toughen and make accurate the RB&W products which must be both fit for the fight and quick to assemble.

Russell, Burdsall & Ward Bolt and Nut Company. Factories at Port Chester, N.Y., Rock Falls, Ill., Coraopolis, Pa.; sales offices at Philadelphia, Chicago, Detroit, Chattanooga, Los Angeles, Portland, Seattle.

RB&W

RUSSELL, BURDSALL & WARD

Making strong the things that make America strong



AND ALLIED FASTENING PRODUCTS...SINCE 1845

THE IRON AGE, November 26, 1942—137

PRICES

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

	Per Cent off List
1/2 in. & smaller x 6 in. & shorter...	65 1/2
9/16 & 5/8 in. x 6 in. & shorter...	62 1/2
3/4 to 1 in. x 6 in. & shorter...	61
1 1/8 in. and larger, all length...	59
All diameters over 6 in. long...	59
Lag, all sizes...	62
Plow bolts...	65

Nuts, Cold Punched or Hot Pressed:

	(Hexagon or Square)
1/2 in. and smaller...	62
9/16 to 1 in. inclusive...	59
1 1/8 to 1 1/2 in. inclusive...	57
1 5/8 in. and larger...	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts U.S.S. S.A.E.

7/16 in. and smaller...	64
1/2 in. and smaller...	62
1/2 in. through 1 in. inclusive...	60
9/16 to 1 in. inclusive...	59
1 1/8 in. through 1 1/2 in. inclusive...	57
1 5/8 in. and larger...	56

In full container lots, 10 per cent additional discount.

Stove Bolts

Packages, nuts loose...	71 and 10
In packages, with nuts attached...	71
In bulk...	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets (1/2 in. and larger)

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	Base per 100 lb. \$3.75
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Small Rivets (7/16 in. and smaller)

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	Per Cent Off List 65 and 5
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Cap and Set Screws Per Cent Off List

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in. inclusive...	64
Upset set screws, cup and oval points...	71
Milled studs...	46
Flat head cap screws, listed sizes...	36
Fillister head cap, listed sizes...	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	\$25.53	\$25.03	\$26.53	\$26.03		
Brooklyn	27.65			28.15		
Jersey City	26.62	26.12	27.62	27.12		
Philadelphia	25.89	25.39	26.89	26.39		
Bethlehem, Pa.	\$25.00	\$24.50	\$26.00	\$25.50		
Everett, Mass.††	25.00	24.50	26.00	25.50		
Swedeland, Pa.		24.50			\$29.50	
Steelton, Pa.		24.50			29.50	
Birdsboro, Pa.	25.00	24.50	26.00	25.50		
Sparrows Point, Md.	25.00	24.50				
Erie, Pa.	24.00	23.50	25.00	24.50		
Neville Island, Pa.	24.00	23.50	24.50	24.00		
Sharpsville, Pa.*	24.00	23.50	24.50	24.00		
Buffalo	24.00	23.00	25.00	24.50	29.50	
Cincinnati	24.68	24.68		25.18		
Canton, Ohio	25.47	24.97	25.97	25.47		
Mansfield, Ohio	26.06	25.56	26.56	26.06		
St. Louis	24.50	24.00				
Chicago	24.00	23.50	24.50	24.00		\$31.34
Granite City, Ill.	24.00	23.50	24.50	24.00		
Cleveland	24.00	23.50	24.50	24.00		
Hamilton, Ohio	24.00	23.50		24.00		
Toledo	24.00	23.50	24.50	24.00		
Youngstown*	24.00	23.50	24.50	24.00		
Detroit	24.00	23.50	24.50	24.00		
Lake Superior fc.						\$28.00
Lytle, Tenn. fc.†	26.76		27.26	26.76		33.00
St. Paul						
Duluth	24.50	19.00	25.00	24.50		
Birmingham	20.38					
Los Angeles	27.25					
San Francisco	27.25					
Seattle	27.25					
Provo, Utah	22.00					
Montreal	27.50	27.50		28.00		
Toronto	25.50	25.50		26.00		

GRAY FORGE IRON: Valley or Pittsburgh furnace..... \$28.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

**Pittsburgh Ferromanganese Co. (Chester furnace only) may charge \$2.25 a ton over maximum basing point prices.

†Price shown is for low-phosphorous iron; high-phosphorous sells for \$28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at \$1 per gross ton above maximum prices.

Delta Chemical & Iron Co., Chicago, may charge \$30 for charcoal iron at its Delta, Mich., furnace.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 per cent to 2.25 per cent); phosphorous differentials, a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over; manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

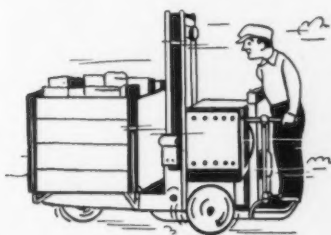
WAREHOUSE PRICES (Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

CITIES	SHEETS			STRIP		Plates (1/4 in. and heavier)	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 ga.)	Cold Rolled	Galv. (24 ga.)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled 2300	Hot Rolled 3100	Cold Drawn 2300	Cold Drawn 3100
Pittsburgh	\$3.35		\$4.65	\$3.60	\$3.20	\$3.40	\$3.40	\$3.35	\$3.65	\$7.45	\$5.75	\$8.40	\$6.75
Chicago	3.25	\$4.10	4.85 ¹	3.60	3.50	3.55	3.55	3.50	3.75	7.35	5.65	8.40	6.75
Cleveland	3.35	4.05	4.62	3.50	3.20	3.40	3.58	3.25	3.75	7.55	5.85	8.40	6.75
Philadelphia	3.55	4.05 ⁵	4.65	3.51	3.31	3.55	3.55	3.85	4.06	7.31	5.86	8.56	7.18
New York	3.58	4.02 ²	5.00	3.96 ⁶	3.51	3.76	3.75	3.84	4.09	7.60	5.90	8.84	7.19
Detroit	3.43	4.30	4.84 ¹	3.68 [*]	3.40	3.60	3.65	3.43	3.80	7.67	5.97	8.70	7.05
Buffalo	3.25	4.30 ¹	4.75 ⁴	3.82	3.52	3.62	3.40	3.35	3.75	7.35	5.65	8.40	6.75
Boston	3.71	4.68	5.11	4.05	3.6	3.85	3.85	3.98	4.13	7.77	6.07	8.91	7.26
Birmingham	3.45 ³		4.75 ¹	3.70 ¹		3.55 ³	3.55 ³	3.50 ³	4.48				
St. Louis	3.39	4.24 ²	4.99 ¹	3.74	3.61	3.69	3.69	3.64	4.02	7.72	6.02	8.77	7.12
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
Milwaukee	3.38	4.23 ²	4.98 ¹	3.73	3.54	3.68	3.68	3.63	3.88	7.58	5.88	8.63	6.98
Baltimore	3.50		5.05	4.00		3.70	3.70	3.85	4.4				
Cincinnati	3.42	4.37 ²	4.42 ¹	3.67	3.45	3.95	3.68	3.60	4.1	7.69	5.99	8.50	7.10
Norfolk	3.85		5.40	4.10		4.05	4.05	4.00					
Washington	3.60			4.10		3.80	3.80	3.95	4.10				
Indianapolis	3.45	4.25	5.01 ¹	3.75	28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Omaha	3.85		5.52 ¹	4.20		4.15	4.15	4.10	4.42				
Memphis	3.85		5.25	4.10		3.95	3.95	3.90	4.31				
New Orleans	4.05			4.30		3.90	3.90	4.10	4.60				
Houston	4.00			4.30		4.05	4.05	3.75					
Los Angeles†	4.95	7.15	5.95	4.90		4.90	4.60	4.35	6.60	9.55	8.55	10.55	9.55
San Francisco†	4.55	7.05	6.10	5.50		4.65	4.35	3.95	6.80	9.80	8.80	10.80	9.80
Seattle†	4.65 ⁷		5.70 ⁷	4.25		4.75	4.45	4.20	5.75		8.00		

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: ¹ 500 to 1499 lb. ² 400 to 1499 lb. ³ 450 to 1499 lb. ⁴ 1000 to 1999 lb. ⁵ 300 to 1999 lb. ⁶ 300 to 10,000 lb. At Philadelphia galvanized sheets, 25 or more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb., galvanized and cold rolled sheets, 750 to 4999 lb., cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. ^{*} 12 gage and heavier, \$3.43. [†] Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

168 Hours per Week

In war plants where battery industrial trucks are working 168 hours a week, the charging circuits are often in use almost whole time. The alkaline batteries are given a complete charge in 6 to 7 hours, and as one charge is completed another is started. This means highest utilization of charging equipment. It is one of the very useful contributions of the alkaline type of battery to the war effort.



Process Efficiency. Many war plants have been successful in laying out a part of their production for straight-line sequence of operations. But they often have other operations which, for purpose of process efficiency, are best performed in one place. In such cases they have found a good solution to the problem in the use of skid boxes, into which the work can be unitized and quickly taken anywhere on the floor by battery lift truck.



It's a Big Job. There is predicted a great shifting of man-power. It's a big job to make available new men for those lost to the draft and to other jobs. But this means new men, mostly untrained, throughout your plant. Fortunately, this presents no great problem in battery maintenance. Alkaline batteries are not easily damaged, even in unskilled hands; their charging and care are easily taught, readily understood and pretty nearly foolproof.

Edison Storage Battery Division
Thomas A. Edison, Inc.
WEST ORANGE, N. J.

DURATION POWER



No one can predict how long the war will last—how long the necessity for peak production will go on. But one prediction will come true: trucks powered by alkaline batteries are those *most* likely to keep up their good work for the duration... are the *least* likely to require power unit replacement.

Long life and dependability are

literally designed into Edison Batteries. Electrochemically and structurally they are built to last a long time, to do a lot of hard work and to require very little maintenance. The result has been that where they are handling the power job in material handling, that job is going well. The flow of production is directly allied to their efficiency.

INDUSTRY NEEDS THE DEPENDABILITY OF

Edison Alkaline BATTERIES

PRICES

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall

(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)

		Seamless	Lap Weld, Cold Drawn	Hot Rolled
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38	
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58	
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35	
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15	
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66	

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	\$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago. \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle.

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe) Base Price—\$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	62½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

	2½	3½
½ in.	25	10
¾ in.	30	16
1 and 1½ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

	61	49½
2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

	30½	12
2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

	25	6
½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

	59	48½
2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

	33½	15½
2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

Ferroalloys

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads) \$135.00

Spiegeleisen

Per Gross Ton Furnace Domestic, 19 to 21% \$36.00 Domestic, 26 to 28% 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size) 50% (carload lots, bulk) \$74.50 50% (ton lots, packed) 87.00 75% (carload lots, bulk) 135.00 75% (ton lots, packed) 151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si) F.o.b. Jackson, Ohio \$29.50* Buffalo 30.75*

For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.

*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are \$1 a ton above Silvery Iron quotations of comparable analysis.

Ferrocchrome

(Per Lb., Contained Cr, Delivered Carload, Lump Size, on Contract) 4 to 6 carbon 13.00c. 2 carbon 19.50c. 1 carbon 20.50c. 0.10 carbon 22.50c. 0.06 carbon 23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Carloads, Bulk)

3 carbon	\$120.00
2.50 carbon	125.00
2 carbon	130.00
1 carbon	140.00

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload	\$2.00
Ferrotungsten, 100 lb. and less	2.25
Ferrovanadium, contract, per lb. contained V, del'd	\$2.70 to \$2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots	\$2.25†
Ferrocobaltititanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload contract, net ton	\$142.50
Ferrocobaltititanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload contract, net ton	\$157.50
Ferrophosphorus, electric or blast furnace materials, carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage freight, equalized with Rockdale, Tenn., gross ton	\$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage, freight equalized with Nashville, gross ton	\$75.00
Ferromolybdenum, per lb., Mo, f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.	80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa.	80c.

*Spot prices are \$5 per ton higher.

†Spot prices are 10c. per lb. of contained element higher.

LAKE SUPERIOR ORES

(51.50% Fe., Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer, 51.50	\$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

COKE*

Furnace

Per Net Ton †Connellsville, prompt \$6.00

Foundry

†Connellsville, prompt	\$6.75 to \$7.00
By-product, Chicago	\$12.25
By-product, New England	\$13.75
By-product, Newark	\$12.40 to \$12.95
By-product, Philadelphia	\$12.38
By-product, Cleveland	\$12.30
By-product, Cincinnati	\$11.75
By-product, Birmingham	\$8.50†
By-product, St. Louis	\$12.02
By-product, Buffalo	\$12.50

*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26, †F.O.B. oven. Ceiling for operators of hand drawn ovens using trucked coal is \$6.50.

FLUORSPAR

	Per Net Ton
Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail	\$25.00
Domestic, f.o.b. Ohio River landing barges	25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	25.00

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Per 1000
Super-duty brick, St. Louis	\$64.60
First quality, Penna., Md., Ky., Mo. & Ill.	51.30
First quality, New Jersey	56.00
Second quality, Penna., Md., Ky., Mo. & Ill.	46.55
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60

Silica Brick

Pennsylvania & Birmingham	\$51.30
Chicago District	58.90
Silica cement, net ton (Eastern)	9.00

Chrome Brick

	Per Net Ton
Standard or chemically bonded, Balt., Plymouth Meeting and Chester	\$54.00

Magnesite Brick

Standard, Balt. and Chester	\$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks (carloads)	\$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00